DATA BOOK

IMPERIAL RADIATOR CO.
LIMITED

CATALOGUE No. 20

JUNE 1926

See Guide for Estimating
on pages 97 and 98.

IMPERIAL RADIATOR CO. LIMITED

IMPERIAL RADIATOR COMPANY
LIMITED

Catalogue and Price List

BOILERS

"New King" Hot Water Boilers
"Royal" Round Steam Boilers
"Royal" Square Sectional Boilers
For Steam and Water
"Royal" Smokeless Steam and Water Boilers
"Royal" Firebox Steam and Water Boilers
"Royal" Bungalow and Laundry Heaters

RADIATORS

"Imperial" and "King" Radiators
For Water and Steam

STEAM and WATER FITTINGS
IRON PIPE and VALVES

IMPERIAL RADIATOR COMPANY LIMITED
Head Office and Works
ST. CATHARINES, ONT.
Sales Offices and Warehouses
TORONTO - MONTREAL
Agencies in the following Cities

WINNIPEG, MAN	CALGARY, ALTA.	HALIFAX, N.S.
SASKATOON, SASK.	VANCOUVER, B.C.	QUEBEC, P.Q.
NEWFOUNDLAND	HAMILTON, ONT.	OTTAWA, ONT.

Catalogue No. 20 January, 1926

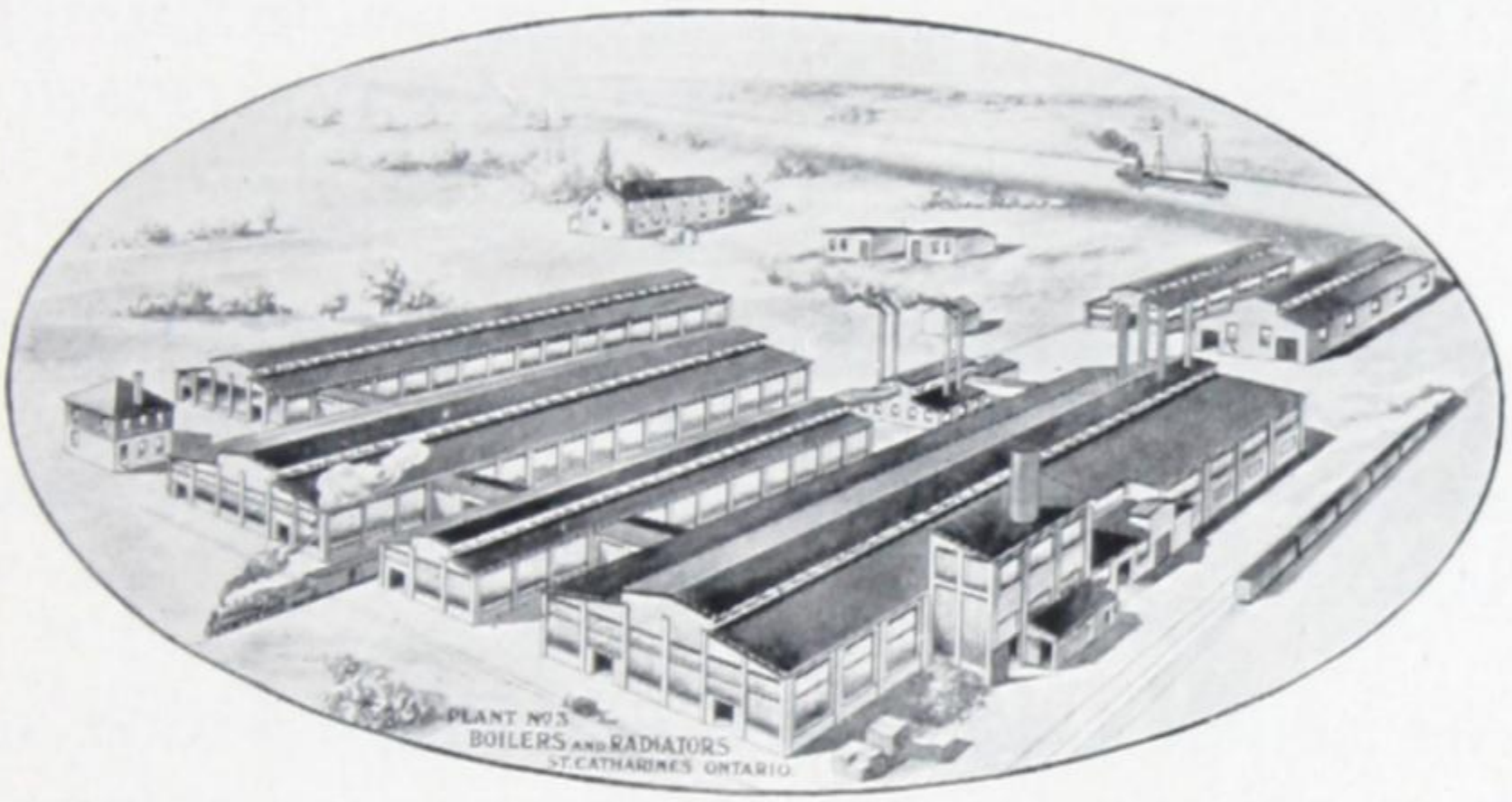
NEW KING AND ROYAL BOILERS

AND

IMPERIAL RADIATORS

FOR

HOT WATER AND STEAM HEATING



VIEW OF MODERN

BOILER AND RADIATOR PLANT

OF

IMPERIAL RADIATOR COMPANY, LIMITED

ST. CATHARINES - - ONT.

To The Trade,--

In this edition of our Hand Book we have endeavoured to present as fully as possible our complete line of Boilers and Radiators, also Fittings and Specialties, etc.

NEW KING and ROYAL Boilers and IMPERIAL Radiators are Made in Canada in our large and up-to-date Boiler and Radiator Plant at St. Catharines, Ont.

Our Products are made of only the best grades of iron, under the most careful supervision, and carry our unqualified guarantee to give absolute satisfaction.

We solicit your valued patronage which shall receive our most careful and expert attention, and invite your closest inspection of our products which can be seen at our show rooms.

Sincerely yours,

IMPERIAL RADIATOR COMPANY
LIMITED

Catalogue No. 20

June, 1926

CONDITIONS OF SALE

1. GUARANTEE—

Our goods are guaranteed to the extent of furnishing new parts to replace those that may prove defective in manufacture. No claim will be allowed unless made within sixty days. Labor and other charges will not be allowed.

2. SHIPMENTS—

(a) All goods are shipped at buyer's risk, and should be carefully examined before receipt for same is given to the Transportation Company. If the Transportation Company tenders delivery of goods in bad order, buyer should insist on the Agent making notation of such condition on the freight bills before accepting, thus enabling him to secure prompt payment of claims, which should be filed by him against carriers for the value of the damaged material. The responsibility of Imperial Radiator Company, Limited, ceases upon delivery of goods in good order to the Transportation Company.

(b) All orders are accepted subject to strikes, accidents, transportation delays, shortage of delivery of raw materials or other causes beyond our control.

3. RETURNS—

Goods must not be returned except by special permission.

IMPERIAL RADIATOR COMPANY, LIMITED

June, 1926

NEW KING

HOT WATER BOILERS

No. 5 Low Base NEW KING BOILER

Push Nipple Construction

NEW KING

HOT WATER BOILERS

No. 6 Low Base

Showing top outlets
and side inlets.

NEW KING
HOT WATER BOILER

Size	Net Rating in Sq. Ft. Direct Radiat'n	Gross Rating in Sq. Ft. Direct Radiat'n	Net Rat'g in Lineal Feet 1 In. Pipe	List Prices Low Base	List Prices High Base	Height to Bottom of Smoke Collar Low Base Inches	Diameter in Inches of Smoke Pipe	Diameter in Inches of Base Ring	Diameter in Inches of Fire Pot Top	Diameter in Inches of Fire Pot Bottom	Depth of Fire Pot	Average Fire Pot Area Sq. Ft.	Average Area Grate Sq. Ft.
2–C	250	375	750	$268.00	$302.00	43½	8	26½	17½	19	16¼	1.82	1.97
2	365	550	1095	320.00	360.00	47½	8	26½	17½	19	16¼	1.82	1.97
2½	420	625	1260	356.00	395.00	51½	8	26½	17½	19	16¼	1.82	1.97
3–C	420	625	1260	356.00	395.00	42½	8	30	19¼	21¼	16¼	2.23	2.46
3	500	750	1500	382.00	425.00	46½	8	30	19¼	21¼	16¼	2.23	2.46
3½	585	875	1755	425.00	465.00	50½	8	30	19¼	21¼	16¼	2.23	2.46
4–C	585	875	1755	425.00	465.00	43½	8	31	22½	24	17¼	2.95	3.14
4	685	1025	2055	462.00	505.00	47½	8	31	22½	24	17¼	2.95	3.14
4½	750	1125	2250	498.00	545.00	51½	8	31	22½	24	17¼	2.95	3.14
5–C	750	1125	2250	498.00	545.00	46¼	10	35	24½	26	18½	3.48	3.69
5	835	1250	2505	550.00	603.00	50¼	10	35	24½	26	18½	3.48	3.69
5½	935	1400	2805	590.00	651.00	54¼	10	35	24½	26	18½	3.48	3.69
6–C	935	1400	2805	590.00	651.00	46½	10	37½	27	28½	18¾	4.20	4.43
6	1000	1500	3000	654.00	700.00	50½	10	37½	27	28½	18¾	4.20	4.43
6–A	1100	1650	3300	706.00	746.00	54½	10	37½	27	28½	18¾	4.20	4.43
6½ C	1100	1650	3300	706.00	746.00	53½	12	40	29½	31	19½	5.00	5.24
6½	1250	1875	3750	775.00	842.00	58½	12	40	29½	31	19½	5.00	5.24
6½ A	1350	2025	4050	840.00	905.00	63½	12	40	29½	31	19½	5.00	5.24
7–C	1350	2025	4050	840.00	905.00	52¼	12	42½	32	33¼	19½	5.85	6.12
7	1500	2250	4500	880.00	950.00	57¼	12	42½	32	33¼	19½	5.85	6.12
7½	1765	2650	5295	945.00	1017.00	62¼	12	42½	32	33¼	19½	5.85	6.12
8–C	1765	2650	5295	945.00	1017.00	55¼	12	46¼	36¼	38¼	19¾	7.67	7.98
8	2000	3000	6000	1052.00	1160.00	61¼	12	46¼	36¼	38¼	19¾	7.67	7.98
8½	2300	3450	6900	1210.00	1326.00	66¼	12	46¼	36¼	38¼	19¾	7.67	7.98
*9–C	2300	3450	6900	1210.00	1326.00	56¼	12	49¼	39¼	40¼	19¾	8.73	9.06
*9	2665	4000	7995	1300.00	1396.00	61¼	12	49¼	39¼	40¼	19¾	8.73	9.06
*9½	3000	4500	9000	1500.00	1600.00	67	12	49¼	39¼	40¼	19¾	8.73	9.06

NOTE.—"NEW KING" Boilers will carry the ratings shown above and mains in addition. No extra charge for Special Headers. All half sizes have five sections above fire pot. All C Sizes have three sections above fire pot. Arranged for Pipe Coil at either side of heater for water for Domestic purposes. For additional measurements see "Roughing-in Section," Pages 33 to 37.

*Sizes No. 8C, 9, 9½ are only made in "King" Water Post Pattern.

NOTE.—For High Base Boilers add to above measurements as follows: No. 2—6¼" No. 3—6¼" No. 4—6¼" No. 5—7¼" No. 6—6½" No. 6½—5¼" No. 7—6¼" No. 8—6½" No. 9—6¼".

NEW KING HOT WATER BOILER

NUMBER AND SIZE OF FLOW AND RETURN OPENINGS

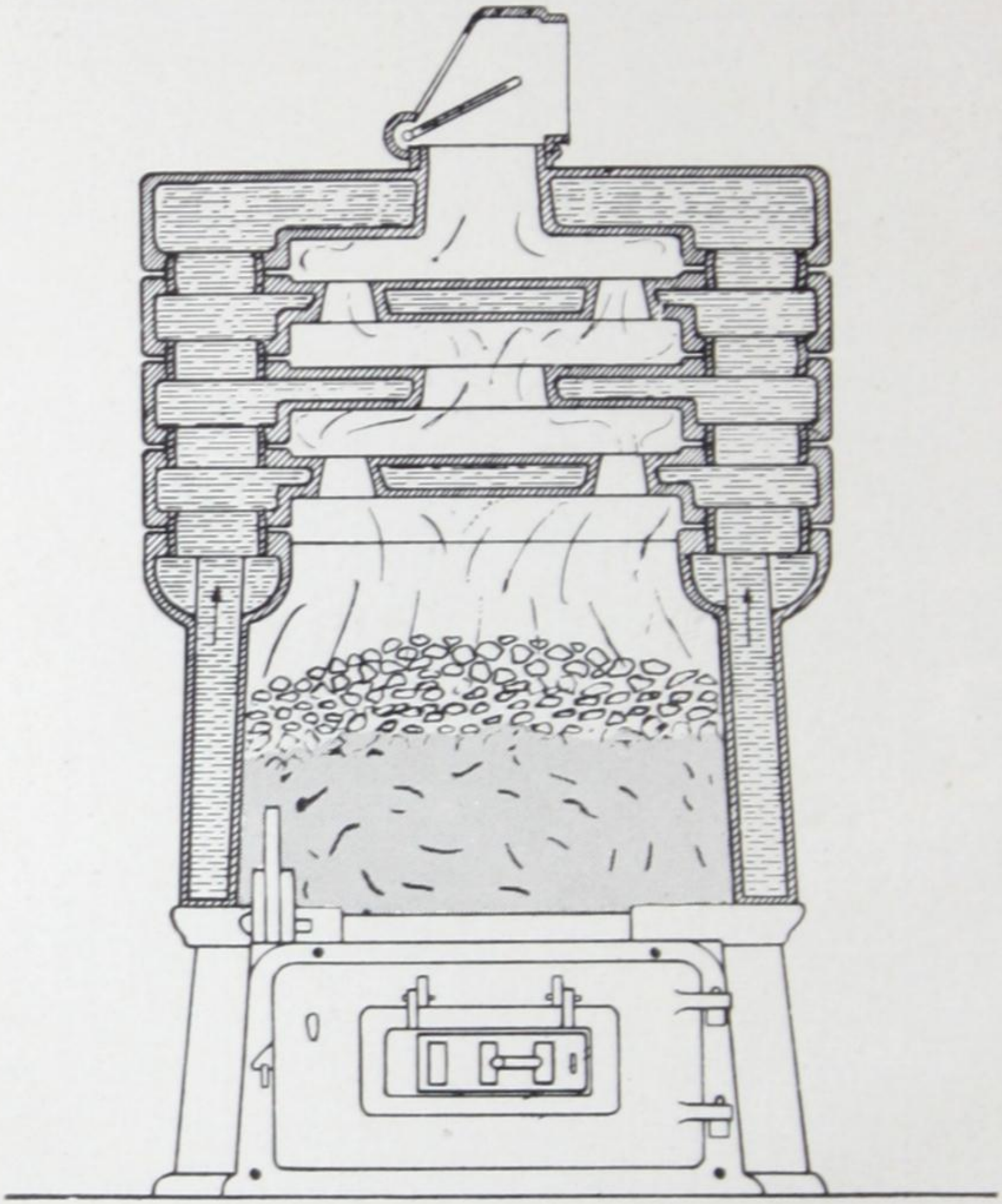
Size	Top Outlet and Side Inlet Boiler		Western Header Openings		Branch Header Openings		Comparative Boiler Sizes
	No. and Size Flow Openings	No. and Size Return Openings	No. and Size Flow Openings	No. and Size Return Openings	No. and Size Flow Openings	No. and Size Return Openings	
2–C	2–2½″	2–2½″	2–2½″ 2–2″	2–2½″ 2–2″	4–2″	4–2″	3–19–W
2	2–2½″	2–2½″	2–2½″ 2–2½″	2–2½″ 2–2″	4–2″	4–2″	4–19–W
2½	2–2½″	2–2½″	2–2½″ 2–2″	2–2½″ 2–2″	4–2″	4–2″	5–19–W
3C	2–3″	2–3″	2–2½″ 2–2″	2–2½″ 2–2″	4–2″	4–2″	3–22–W
3	2–3″	2–3″	2–2½″ 2–2″	2–2½″ 2–2″	4–2″	4–2″	4–22–W
3½	2–3″	2–3″	2–2½″ 2–2″	2–2½″ 2–2″	4–2″	4–2″	5–22–W
4–C	2–3″	2–3″	2–2½″ 2–2″	2–2½″ 2–2″	4–2″	4–2″	3–25–W
4	2–3″	2–3″	2–2½″ 2–2″	2–2½″ 2–2″	4–2″	4–2″	4–25–W
4½	2–3″	2–3″	2–2½″ 2–2″	2–2½″ 2–2″	4–2″	4–2″	5–25–W
5–C	2–4″	2–4″	2–2½″ 2–3″	2–2½″ 2–3″	7–2″	7–2″	3–26–W
5	2–4″	2–4″	2–2½″ 2–3″	2–2½″ 2–3″	7–2″	7–2″	4–26–W
5½	2–4″	2–4″	2–2½″ 2–3″	2–2½″ 2–3″	7–2″	7–2″	5–26–W
6C	2–4″	2–4″	2–2½″ 2–3″	2–2½″ 2–3″	7–2″	7–2″	3–28–W
6	2–4″	2–4″	2–2½″ 2–3″	2–2½″ 2–3″	7–2″	7–2″	4–28–W
6–A	2–4″	2–4″	2–2½″ 2–3″	2–2½″ 2–3″	7–2″	7–2″	5–28–W
6½–C	2–5″	2–5″	4–3″	4–3″	8–2″	8–2″	3–31–W
6½	2–5″	2–5″	4–3″	4–3″	8–2″	8–2″	4–31–W
6½–A	2–5″	2–5″	4–3″	4–3″	8–2″	8–2″	5–31–W
7–C	2–5″	2–5″	4–3″	4–3″	11–2″	11–2″	3–34–W
7	2–5″	2–5″	4–3″	4–3″	11–2″	11–2″	4–34–W
7½	2–5″	2–5″	4–3″	4–3″	11–2″	11–2″	5–34–W
8–C	2–5″	2–5″	2–3″ 2–4″	2–3″ 2–4″	13–2″	13–2″	3–38–W
8	2–5″	2–5″	2–3″ 2–4″	2–3″ 2–4″	13–2″	13–2″	4–38–W
8½	2–5″	2–5″	2–3″ 2–4″	2–3″ 2–4″	13–2″	13–2″	5–38–W
9–C	2–5″	2–5″	2–3″ 2–4″	2–3″ 2–4″	13–2″	13–2″	3–41–W
9	2–5″	2–5″	2–3″ 2–4″	2–3″ 2–4″	13–2″	13–2″	4–41–W
9½	2–5″	2–5″	2–3″ 2–4″	2–3″ 2–4″	13–2″	13–2″	5–41–W

Western Headers are Standard, and unless otherwise specified Boilers requiring Headers will be shipped accordingly.

NEW KING

HOT WATER BOILERS

PUSH NIPPLE CONSTRUCTION



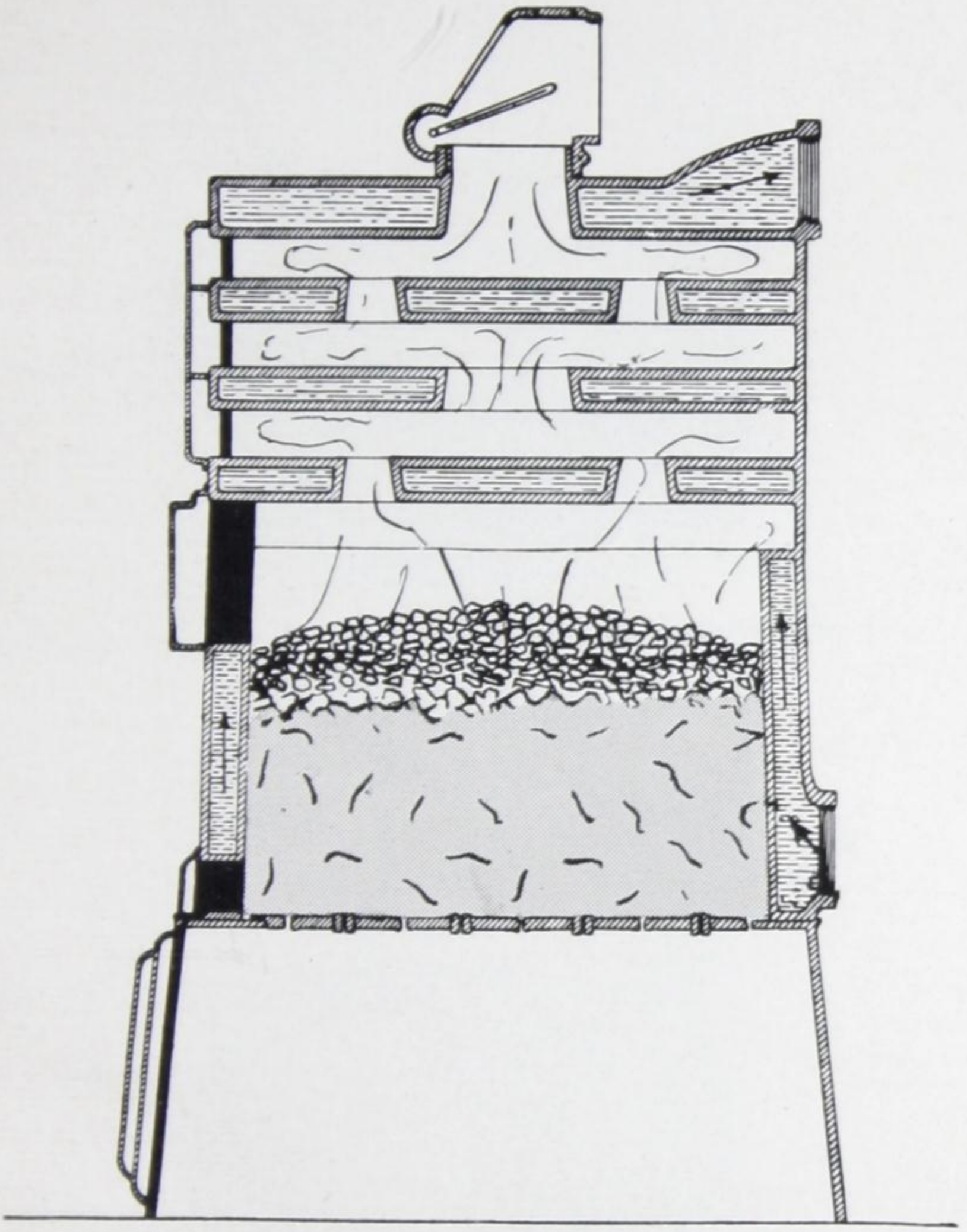
SECTIONAL VIEW

Showing Two Side Nipple Construction and Waterways, Combustion Chamber and Fire Travel

NEW KING

HOT WATER BOILERS

PUSH NIPPLE CONSTRUCTION

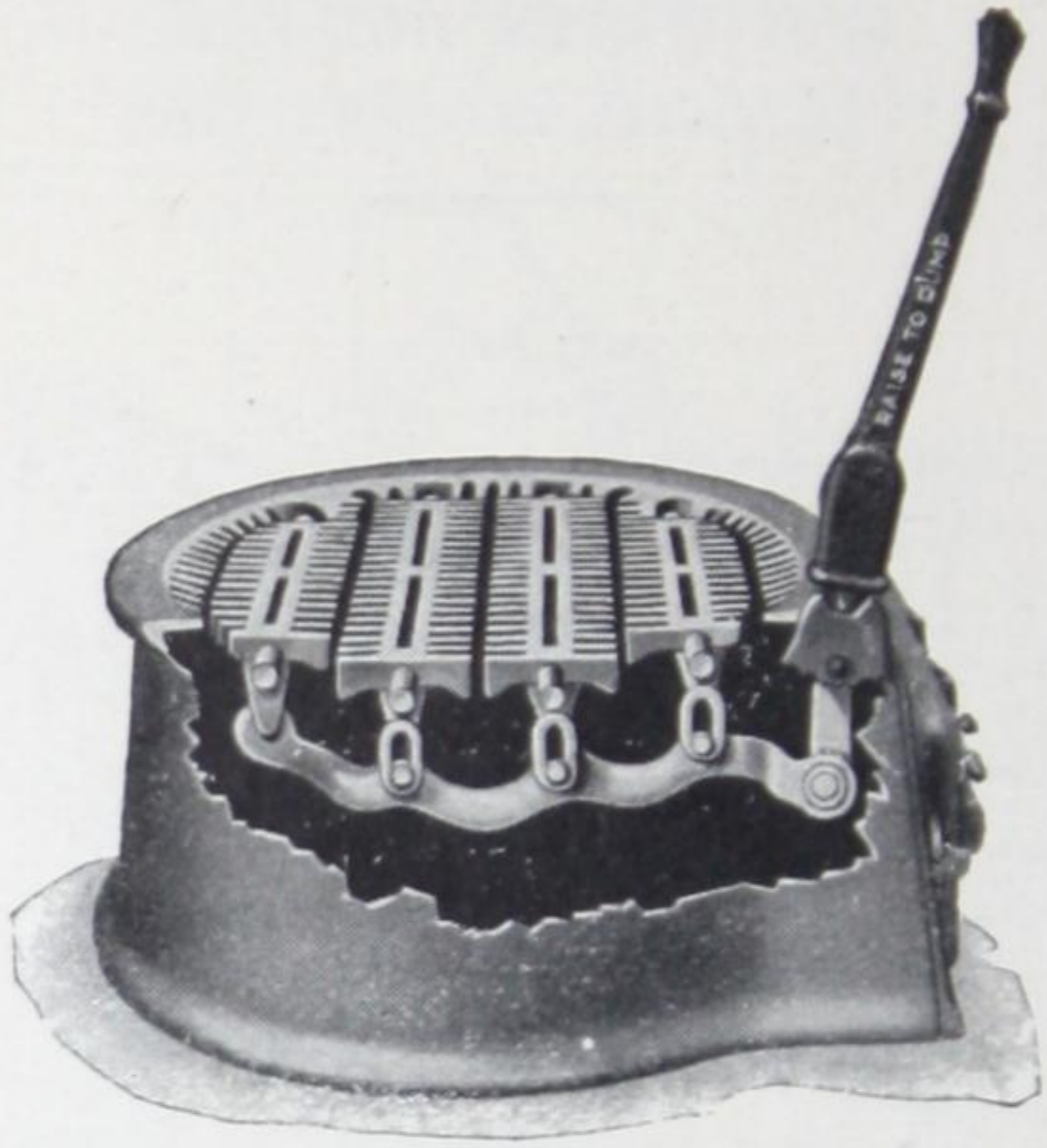


SECTIONAL VIEW

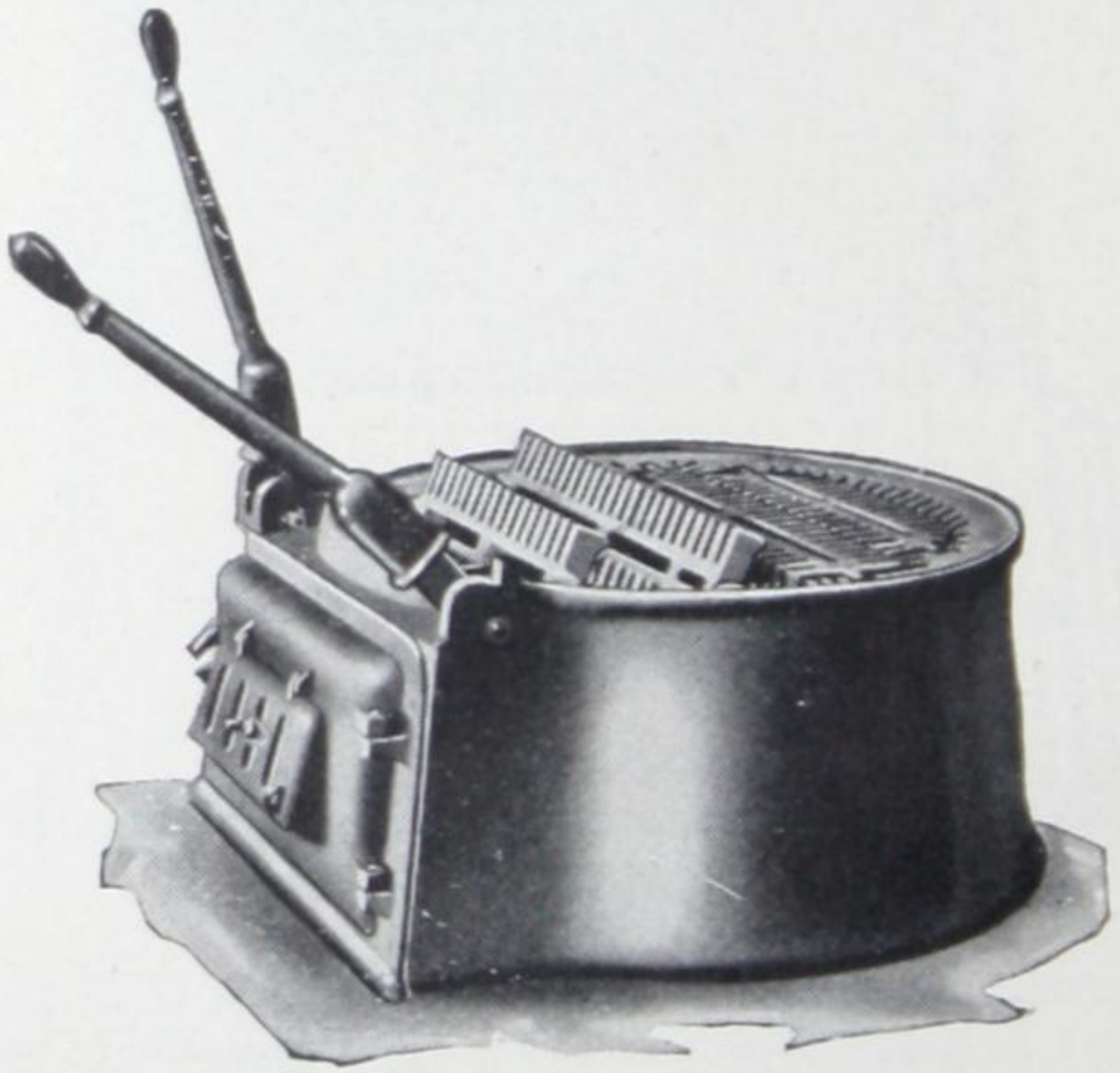
Front to Back

Showing Heating Surface, Fire Travel and Combustion Chamber.

NEW KING
HOT WATER BOILERS

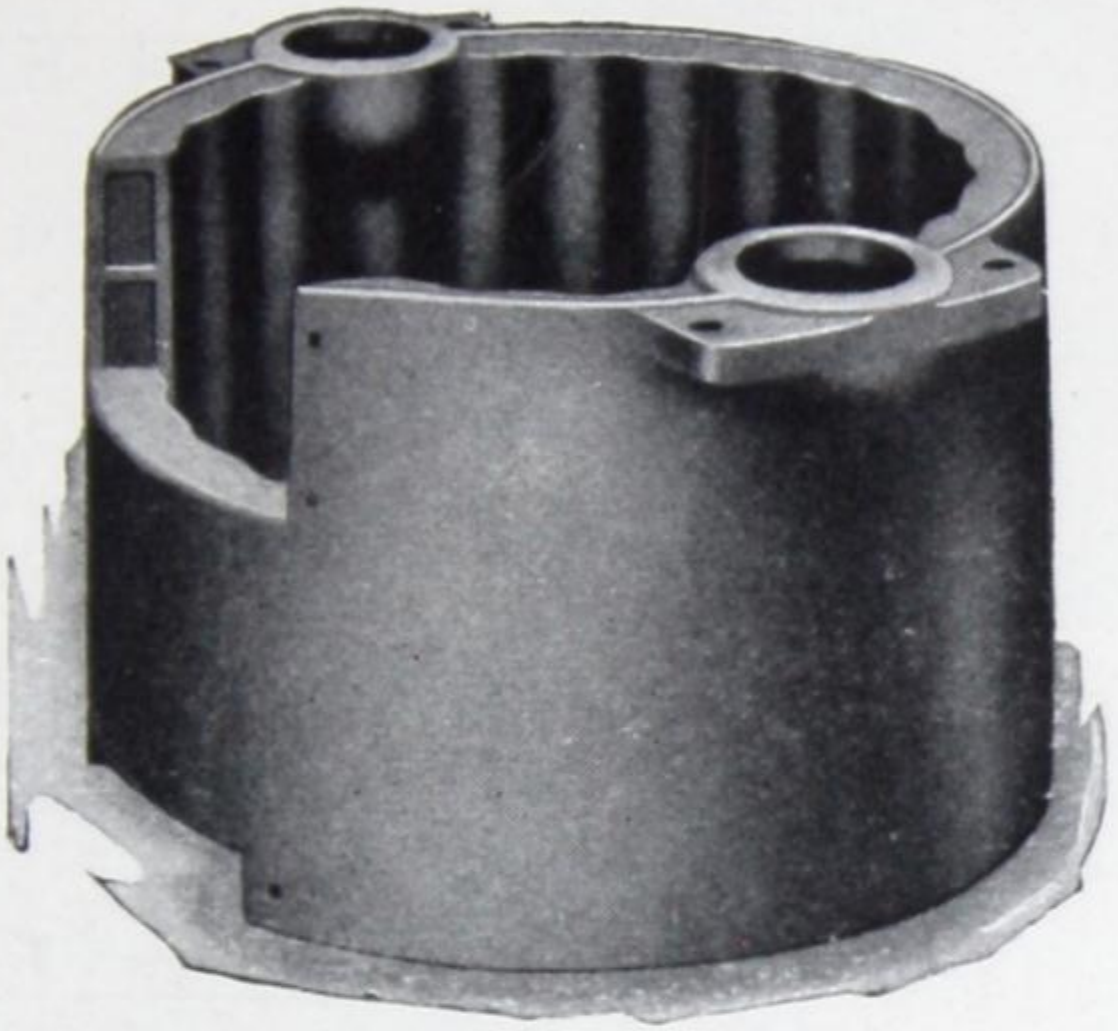


Base—Showing Grates and Shaking Mechanism
Single Shaker



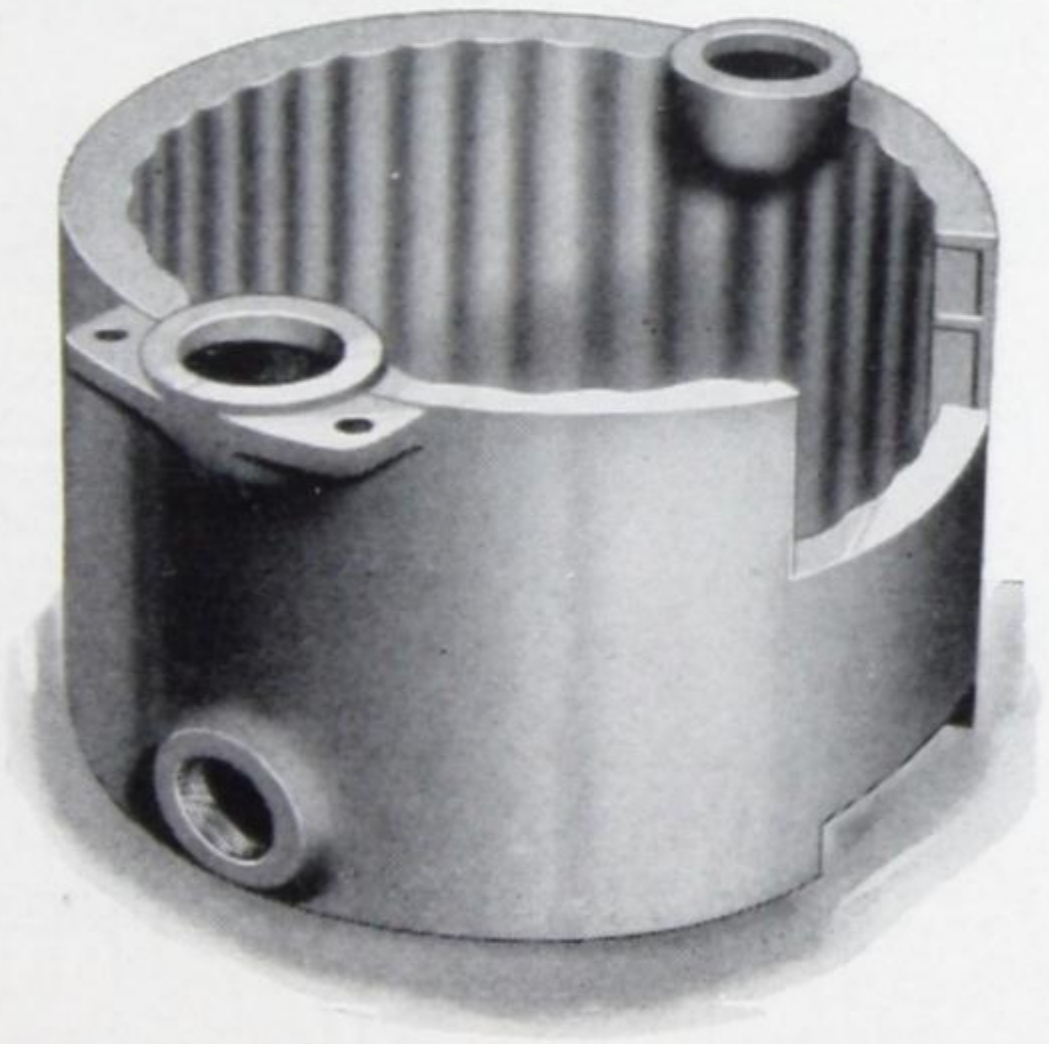
Base—Showing Grates and Double Shaker

NEW KING
HOT WATER BOILERS



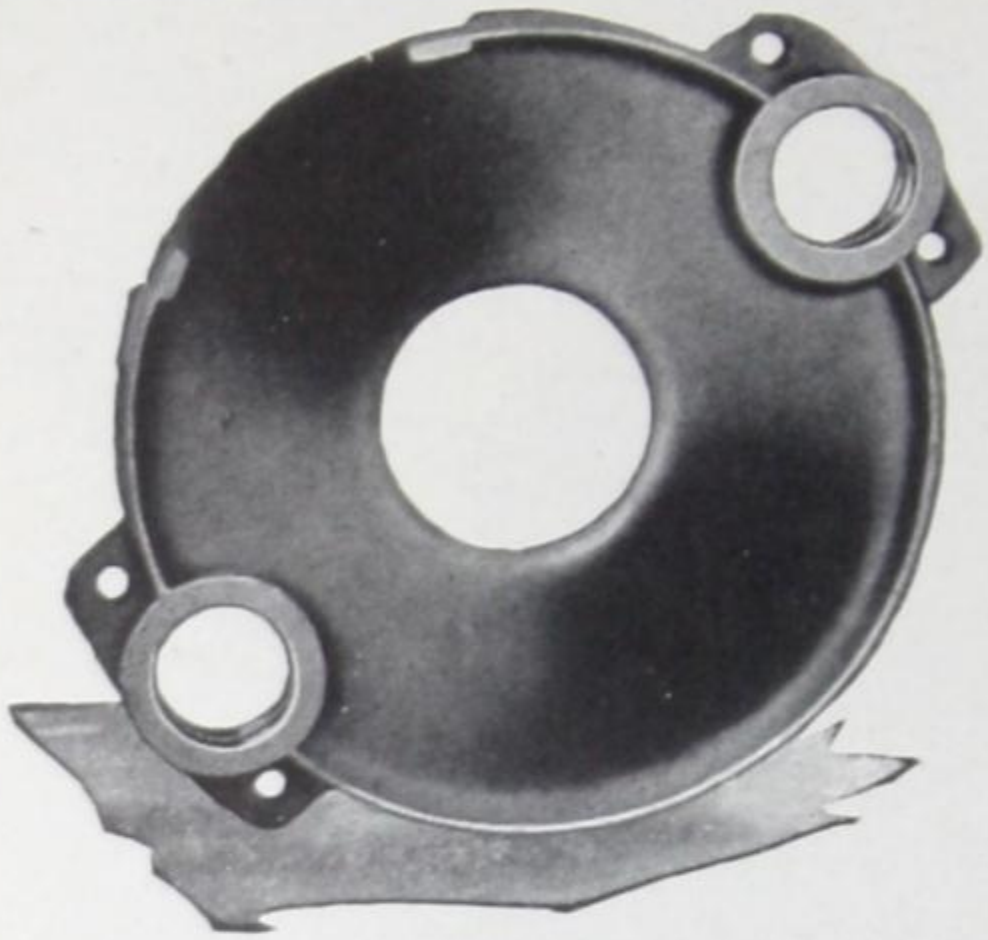
NEW KING FIREPOT—BACK INLET

Showing wide corrugation and two side push nipple connections.



NEW KING FIRE POT--SIDE INLET

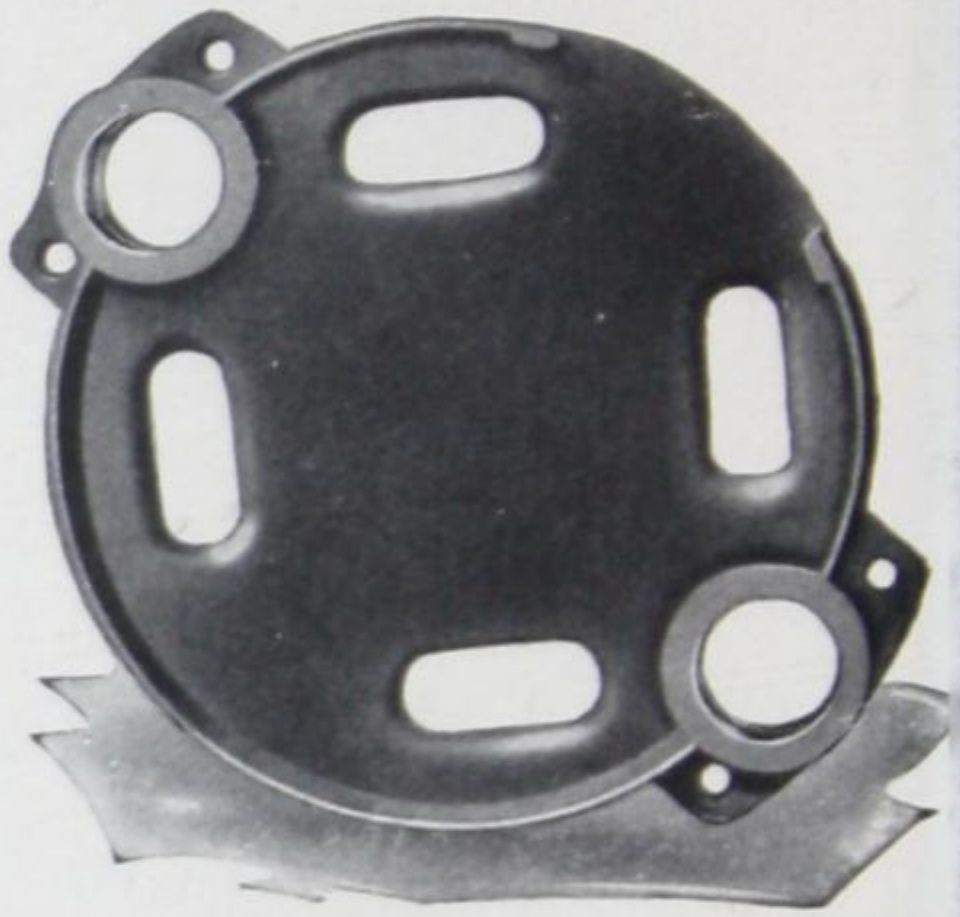
Showing Return Inlet on side of Firepot.



NEW KING SECOND SECTION

NEW KING

HOT WATER BOILERS



NEW KING FIRST SECTION

Showing distribution of flue openings.

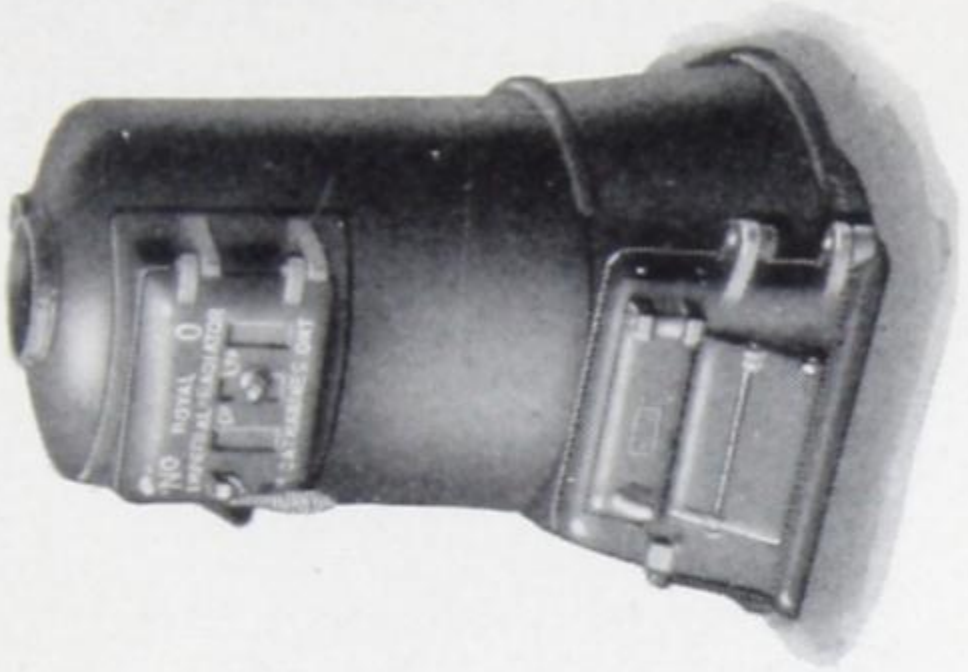
DOMESTIC HEATERS

Price List

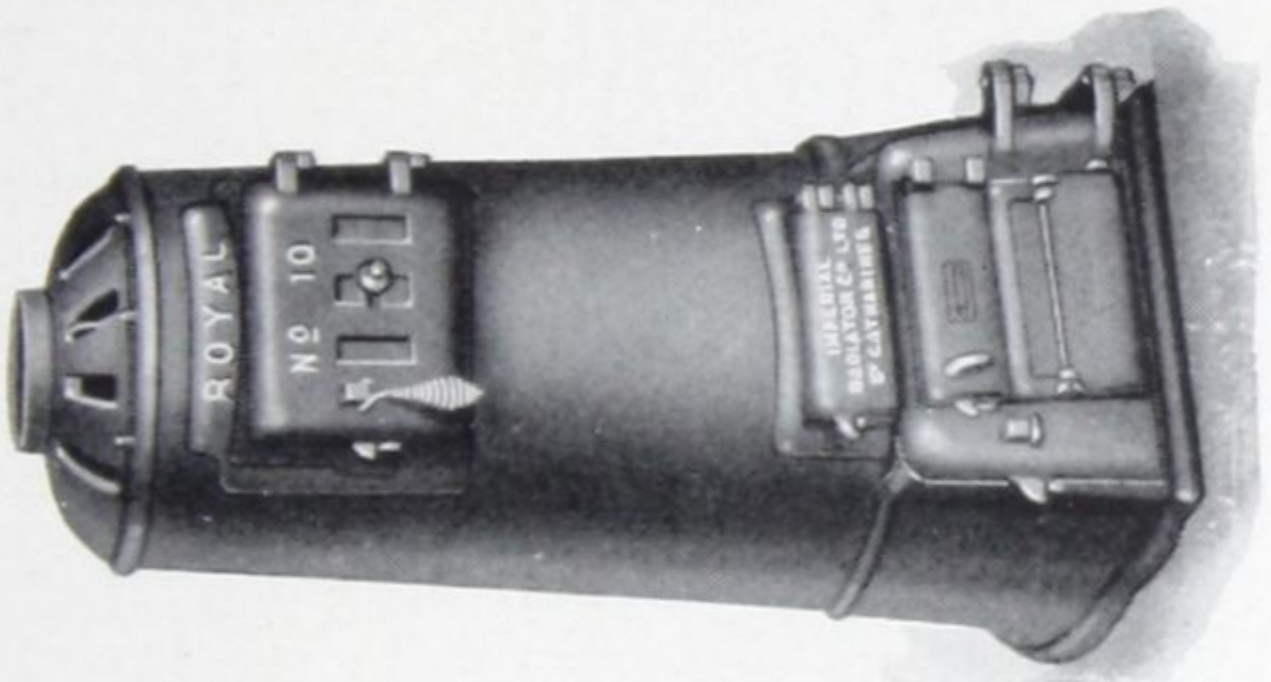
Sizes	Size Connection	List Price
No. 1-2-3	¾″	3.50
No. 4-5-6	¾″	4.25
No. 6½-7-8-9	1″	5.50

NOTE—Smaller size Heaters will fit larger Boilers.

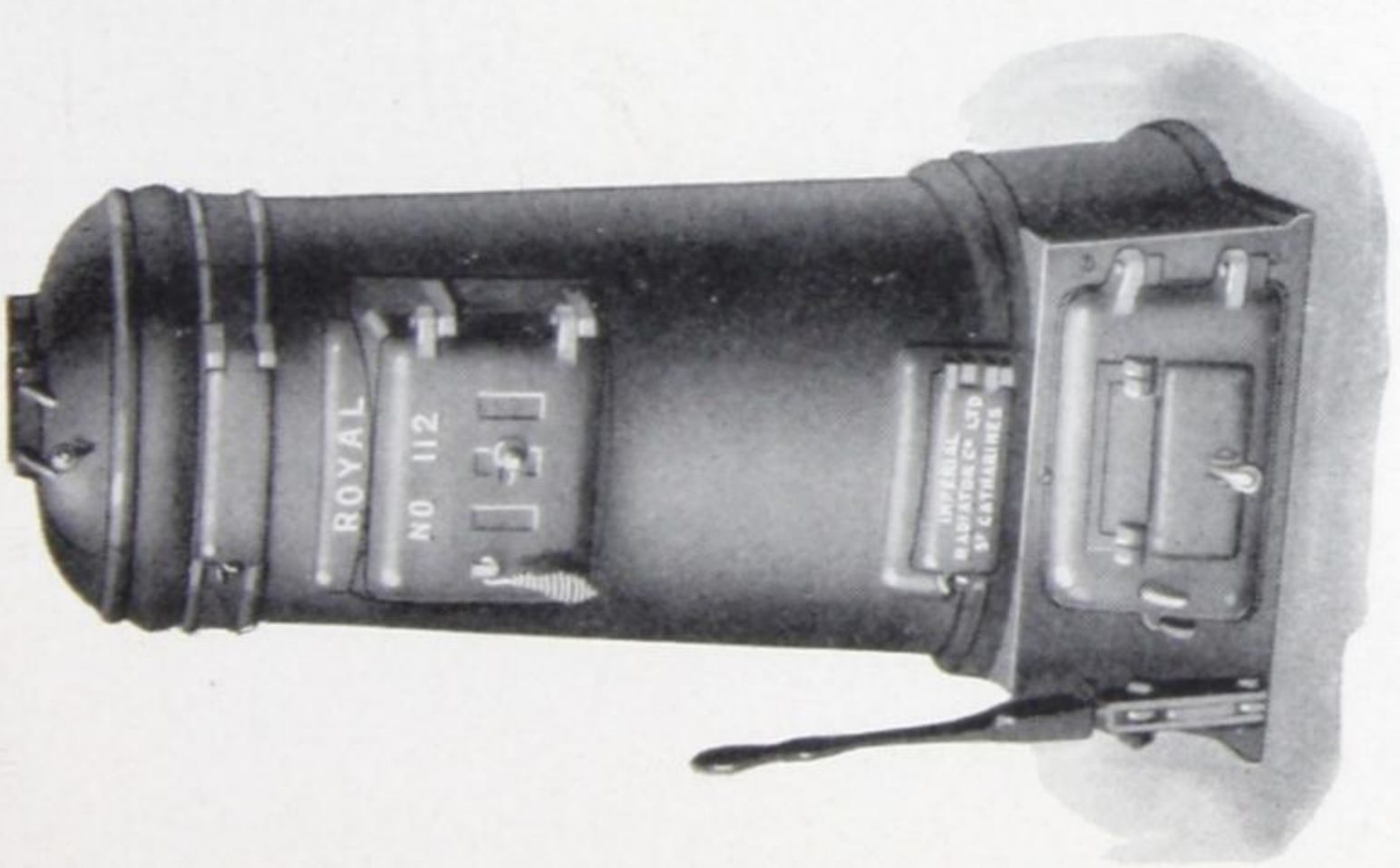
ROYAL
WATER AND LAUNDRY HEATERS



NO. 0 ROYAL WATER HEATER

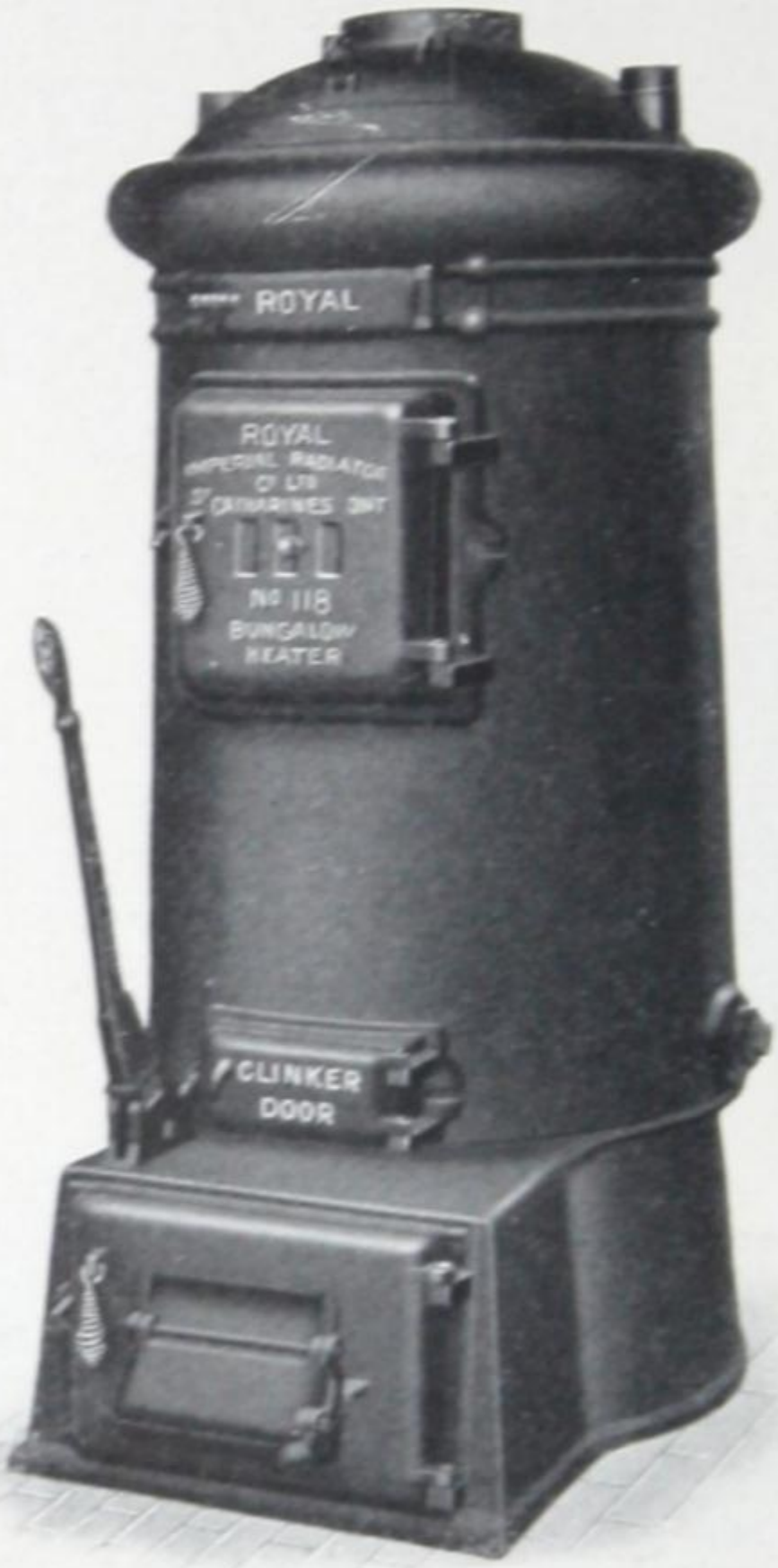


NO. 10 ROYAL WATER HEATER



NO. 112 ROYAL WATER HEATER

ROYAL BUNGALOW HEATERS



No. 118

No. 115

ROYAL

BUNGALOW HEATERS

PRICES, DIMENSIONS AND CAPACITIES

No.	List Price	Capacity Gallons	Approximate Gross Capacity Square Feet	Net Capacity Square Feet	Nominal Diameter Grate, Inches	Grate Area, Square Feet	Outlets and Inlets, Inches	Comparative Heater Sizes
0	**$45.00**	50	75	50	10	$0.54	1–1½	T. 00
10	**63.00**	90	110	75	10	.54	1–1½	T. 0
12	**120.00**	190	225	150	12	.80	1–2½	T. 10
112	**143.00**	210	250	200	12	.80	1–2½	T. 12
* 15	**164.00**	380	450	325	15	1.23	1–3	T. 20
*115	**203.00**	425	495	400	15	1.23	1–3	T. 22
* 18	**210.00**	450	525	460	18	1.77	3–2	T. 30
*118	**249.00**	525	600	510	18	1.77	3–2	T. 32

NOTE:—*These sizes equipped with Complete Set Firing Tools.

ROYAL

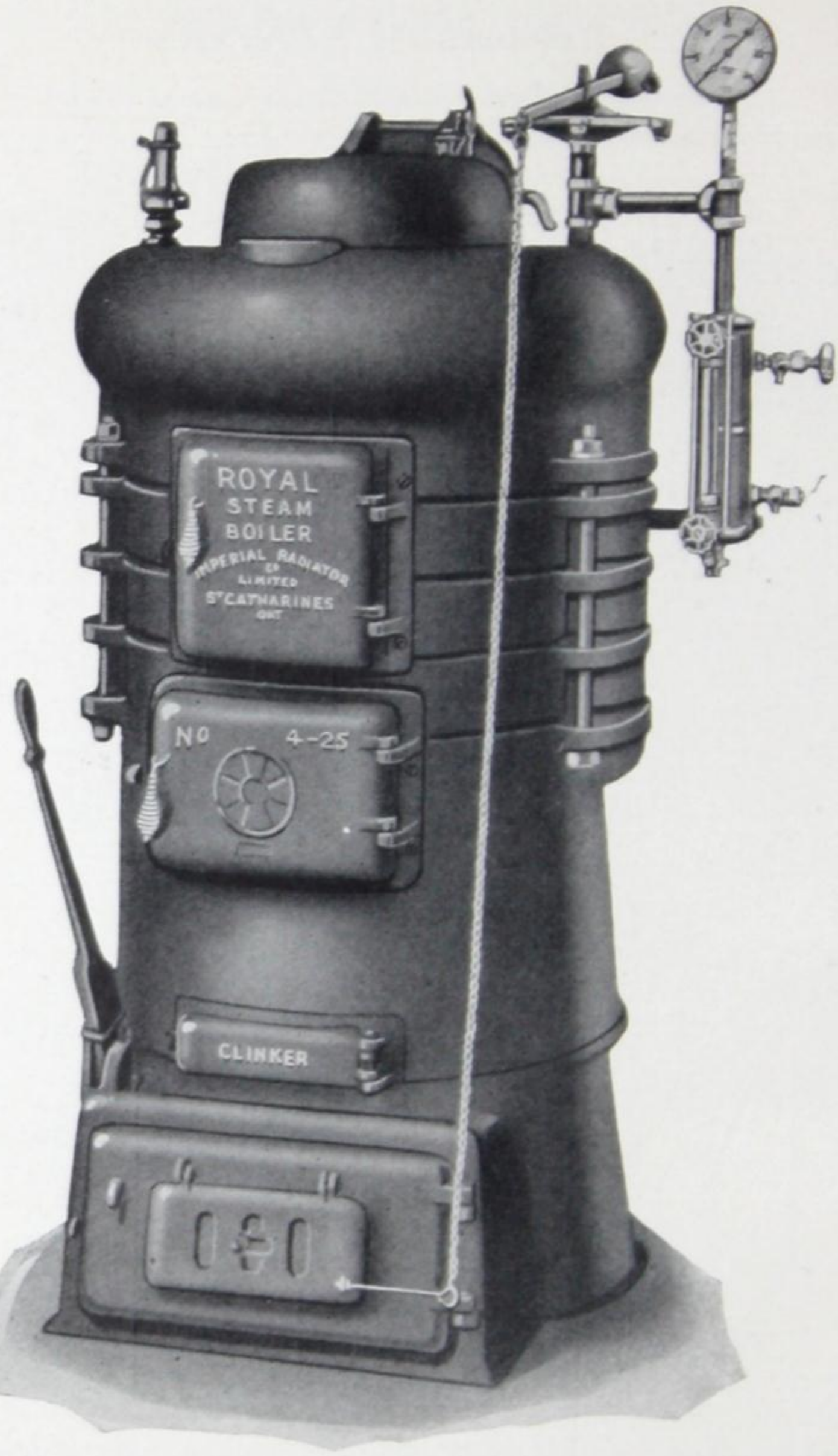
LAUNDRY HEATERS

PRICES, DIMENSIONS AND CAPACITIES

No.	List Price	Capacity Gallons	Approximate Gross Capacity Square Feet	Nominal Diameter Grate, Inches	Grate Area Square Feet	Outlets and Inlets, Inches
1	**$63.00**	100	120	10	45	1–1¼

NOTE:—For additional measurements see "Roughing In Section," Page 38.

ROYAL
ROUND STEAM BOILERS



No. 4-25-S Round Steam Boiler, Low Base

ROYAL

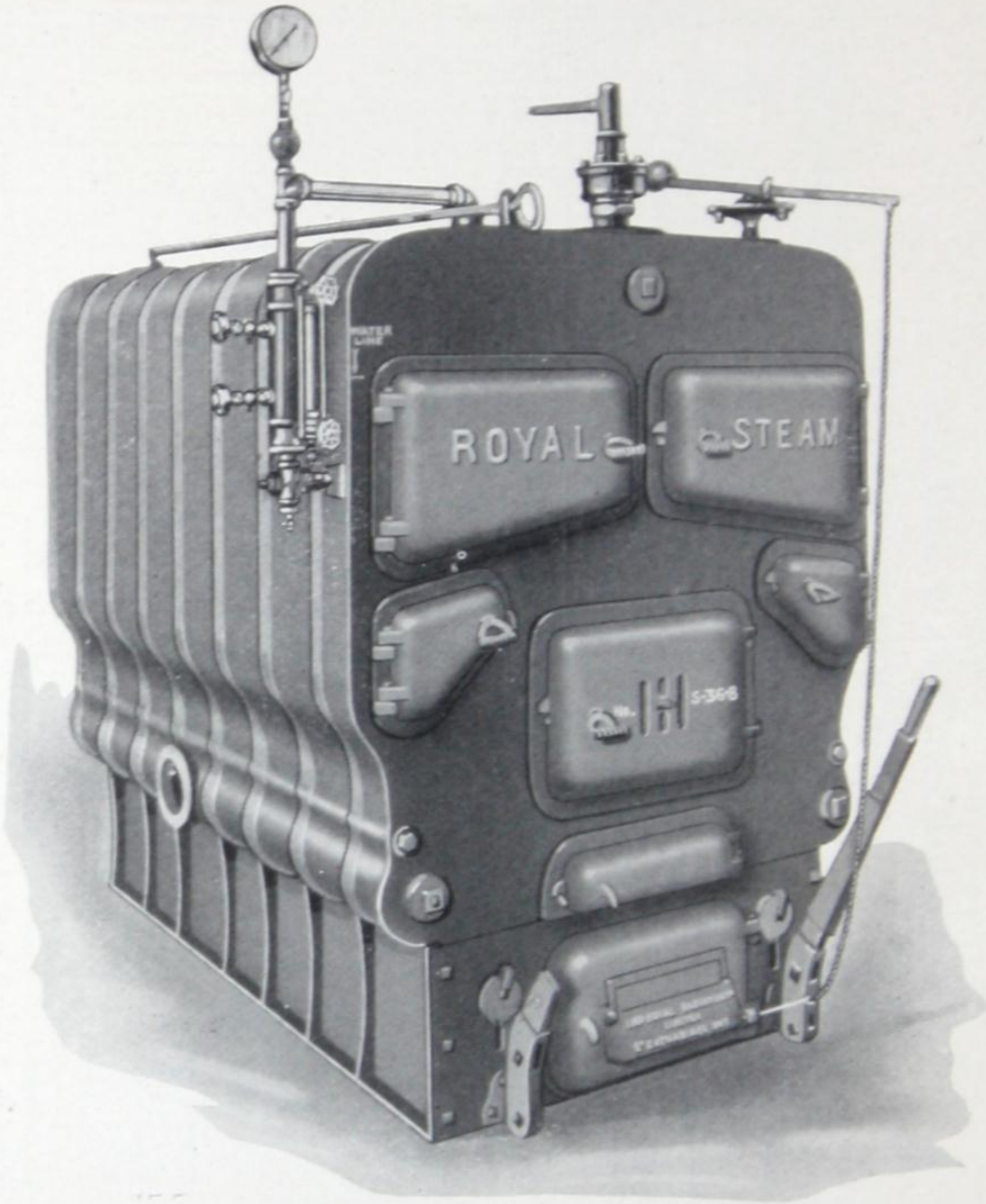
ROUND STEAM BOILERS

LISTS, DIMENSIONS AND CAPACITIES

Sizes of Boilers	Gross Rating in Sq. Ft. Direct Radiation	List Prices	Height to Top of Domes, Inches	Height of Water Line, Inches	Diameter in Inches of				Depth of Fire Pot	Average Fire Pot Area Sq. Ft.	Average Grate Area Sq. Ft.	No. and Size of Connec'ns		Sizes of Boilers
					Smoke Pipe	Base Ring	Fire Pot Top	Fire Pot Bottom				Outlets Inches	Inlets Inches	
3–19–S	300	**$205.00**	50	41 1/2	8	26 1/2	17 1/2	19	16 3/4	1.82	1.97	1–2 1/2	1–2 1/2	3–19–S
4–19–S	350	**215.00**	54	45 1/2	8	26 1/2	17 1/2	19	16 3/4	1.82	1.97	1–2 1/2	1–2 1/2	4–19–S
5–19–S	400	**235.00**	58	49 1/2	8	26 1/2	17 1/2	19	16 3/4	1.82	1.97	1–2 1/2	1–2 1/2	5–19–S
3–22–S	450	**255.00**	51	40 1/2	9	30	19 3/4	21 1/4	16 3/4	2.23	2.46	1–3	1–3	3–22–S
4–22–S	525	**295.00**	55	44 1/2	9	30	19 3/4	21 1/4	16 3/4	2.23	2.46	1–3	1–3	4–22–S
5–22–S	575	**312.50**	59	48 1/2	9	30	19 3/4	21 1/4	16 3/4	2.23	2.46	1–3	1–3	5–22–S
3–25–S	550	**295.00**	51	41 1/2	9	31	22 1/2	24	17 1/4	2.95	3.14	1–3 1/2	1–3 1/2	3–25–S
4–25–S	625	**325.00**	55	45 1/2	9	31	22 1/2	24	17 1/4	2.95	3.14	1–3 1/2	1–3 1/2	4–25–S
5–25–S	700	**337.50**	59	49 1/2	9	31	22 1/2	24	17 1/4	2.95	3.14	1–3 1/2	1–3 1/2	5–25–S
3–28–S	800	**375.00**	56 1/4	44 1/2	10	37 1/2	27	28 1/2	18 3/4	4.20	4.43	1–4	1–4	3–28–S
4–28–S	900	**400.00**	61 1/4	48 1/2	10	37 1/2	27	28 1/2	18 3/4	4.20	4.43	1–4	1–4	4–28–S
5–28–S	1000	**425.00**	65 3/4	52 1/2	10	37 1/2	27	28 1/2	18 3/4	4.20	4.43	1–4	1–4	5–28–S
3–31–S	1100	**450.00**	57 3/4	44 1/2	10	40	29 1/2	31	19 1/2	5.00	5.24	1–5	1–5	3–31–S
4–31–S	1275	**500.00**	62 1/4	48 1/2	10	40	29 1/2	31	19 1/2	5.00	5.24	1–5	1–5	4–31–S
5–31–S	1400	**525.00**	66 3/4	52 1/2	10	40	29 1/2	31	19 1/2	5.00	5.24	1–5	1–5	5–31–S
3–34–S	1300	**500.00**	64 1/2	51 1/4	11	42 1/2	32	33 1/2	19 1/2	5.85	6.12	1–5	1–5	3–34–S
4–34–S	1500	**550.00**	69 1/4	56	11	42 1/2	32	33 1/2	19 1/2	5.85	6.12	1–5	1–5	4–34–S
5–34–S	1650	**587.50**	74	60 3/4	11	42 1/2	32	33 1/2	19 1/2	5.85	6.12	1–5	1–5	5–34–S

NOTE:—The Ratings given provide that all piping, in addition to the direct Radiation to be used, shall be figured as Radiating Surface in estimating the size of Boiler required. When soft coal is used for fuel, one size larger boiler is required than when hard coal is used. For additional measurements see "Roughing-in Section," Page 39.

ROYAL
SQUARE SECTIONAL BOILERS



No. S-36-8 Steam Boiler

For Tappings and other Measurements, see page 41 and 42.

ROYAL
SQUARE SECTIONAL BOILERS
STEAM
PRICES, DIMENSIONS AND CAPACITIES

Size	Gross Rating Square Feet Radiation	List Price	Grate Area Square Feet	Average Fire Pot Area Square Feet	Regular Tappings Inches		Size Foundation Inches	Height to Top of Outlet, Inches	Total Width Inches	Total Length Inches	Height to Water Line, Inches	Smoke Pipe	Shipping Weights
					Supply, Inches	Return, Inches							
S-19-5	600	**$312.50**	3.37	4.78	2-3	2-3	21½x29[3]	52	32½	29¾	43¼	10	2,025
S-19-6	750	**350.00**	4.19	5.95	2-3	2-3	21½x36	52	32½	36	43¼	10	2,365
S-19-7	900	**400.00**	5.02	7.12	2-3	2-3	21½x42	52	32½	42¼	43¼	10	2,705
S-25-5	1,100	**450.00**	4.95	6.13	2-4	2-4	28 x33	57¼	36½	33	47¼	12	2,625
S-25-6	1,350	**512.50**	6.16	7.64	2-4	2-4	28 x40	57¼	36½	40	47¼	12	3,075
S-25-7	1,600	**575.00**	7.38	9.15	2-4	2-4	28 x47	57¼	36½	47	47¼	12	3,525
S-25-8	1,850	**637.50**	8.60	10.65	2-4	2-4	28 x54	57¼	36½	54	47¼	12	3,975
S-36-5	2,100	**700.00**	9.38	11.77	2-5	2-5	41½x30	70	56	43½	57½	16	4,740
S-36-6	2,650	**837.50**	11.50	14.69	2-5	2-5	41½x47½	70	56	52	57½	16	5,560
S-36-7	3,150	**962.00**	13.75	17.61	3-5	2-5	41½x56	70	56	60½	57½	16	6,380
S-36-8	3,700	**1,100.00**	16.00	20.54	3-5	2-5	41½x64½	70	56	69	57½	16	7,200
S-36-9	4,200	**1,225.00**	18.25	23.46	3-5	2-5	41½x73	70	56	77½	57½	16	8,020
S-36-10	4,725	**1,362.50**	20.50	26.38	4-5	2-5	41½x81½	70	56	86	57½	16	8,820
S-36-11	5,250	**1,487.50**	22.75	29.30	4-5	2-5	41½x90	70	56	94½	57½	16	9,620
S-36-12	5,775	**1,625.00**	25.00	32.22	4-5	2-5	41½x98½	70	56	103	57½	16	10,042
S-36-13	6,300	**1,750.00**	27.25	35.14	4-5	2-5	41½x107	70	56	111½	57½	16	11,220
S-48-6	5,275	**1,500.00**	17.84	22.38	2-6	2-4	54 x59½	80	67	64½	68	20	9,090
S-48-7	6,300	**1,750.00**	21.33	26.76	3-6	2-4	54 x70	80	67	75	68	20	10,530
S-48-8	7,325	**2,012.50**	24.84	31.17	3-6	2-4	54 x80½	80	67	85½	68	20	11,970
S-48-9	8,350	**2,262.50**	28.33	38.55	3-6	2-4	54 x91	80	67	96	68	20	13,410
S-48-10	9,375	**2,525.00**	31.83	39.94	3-6	2-4	54x101½	80	67	106½	68	20	14,850

X Add to Length to allow for Smoke Hood as follows:—15 and 19 Series, 12 inches—25 and 36 Series, 14 inches—48 Series, 20 inches. 48 Series sections are in halves.

NOTE:—The ratings given provide that all piping in addition to the direct radiation to be used, shall be figured as radiating surface in estimating size of boiler required.

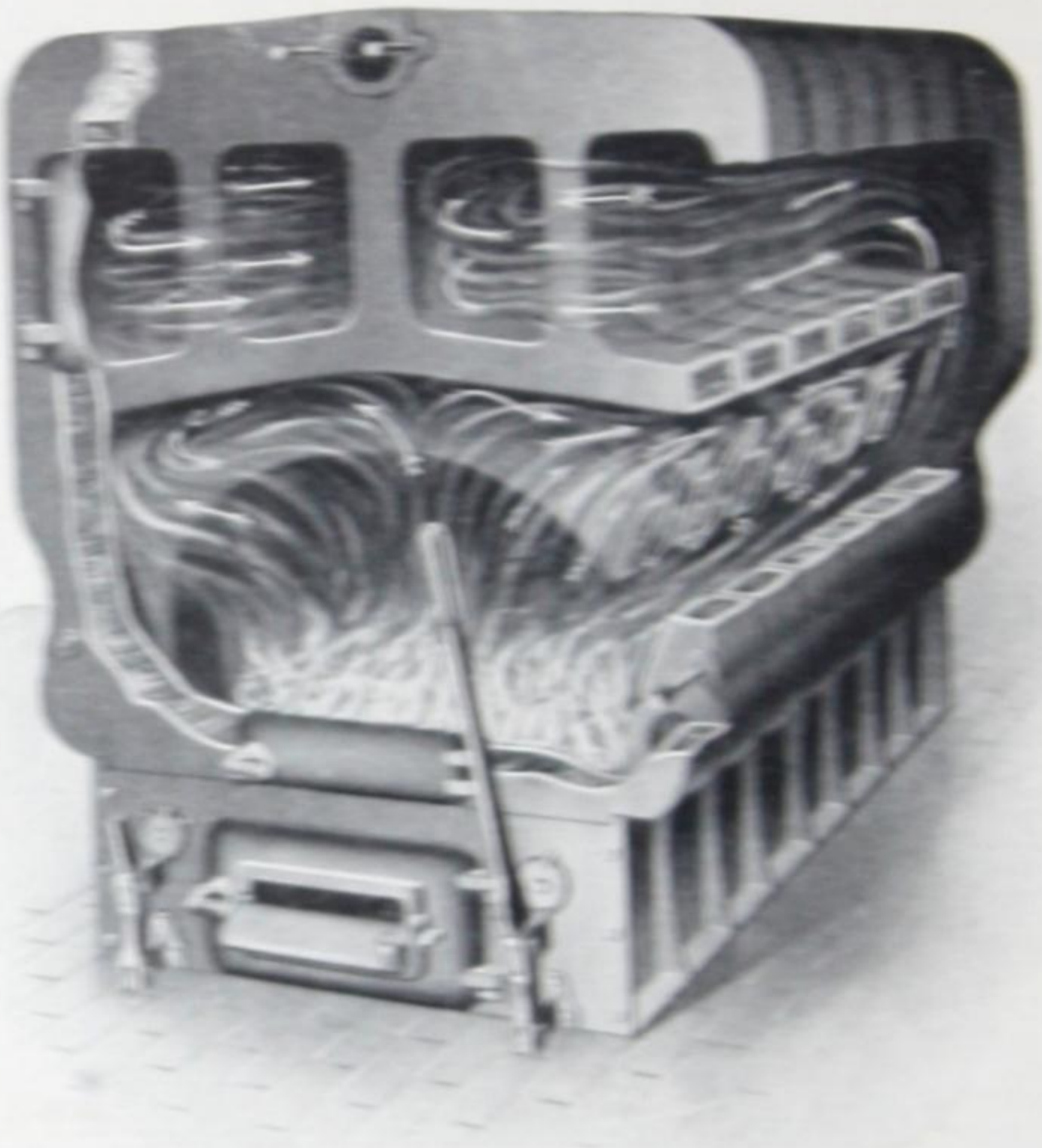
NOTE:—For direct indirect radiation add 30 per cent. For indirect radiation add 60 per cent.

When soft coal is used for fuel, one size larger boiler is required than when hard coal is used.

Arranged for pipe coil for heating water for domestic purposes.

ROYAL

SQUARE SECTIONAL BOILERS



No. 36"-8 BOILER

Sectional View

Showing Fire Travel and Water Ways

ROYAL

SQUARE SECTIONAL BOILERS—WATER

PRICES, DIMENSIONS AND CAPACITIES

Size	Gross Rating Square Feet Radiation	List Price	Grate Area Square Feet	Average Fire Pot Area Square Feet	Regular Tappings Inches		Size Foundation Inches	Height to Top Of Outlet, Inches	Total Width Inches	Total Length Inches	Smoke Pipe	Shipping Weight
					Supply Inches	Return Inches						
W-19-5	1,000	**$287.50**	3.37	4,78	2-3	2-3	21½x29¾	52	32½	29¾	10	1,965
W-19-6	1,250	**325.00**	4.19	5.95	2-3	2-3	21½x36	52	32½	36	10	2,305
W-19-7	1,500	**375.00**	5.02	7.12	2-3	2-3	21½x42	52	32½	42¼	10	2,645
W-25-5	1,850	**425.00**	4.95	6.13	2-4	2-4	28 x33	57¼	36½	33	12	2,550
W-25-6	2,250	**487.50**	6.16	7.64	2-4	2-4	28 x40	57¼	36½	40	12	3,000
W-25-7	2,650	**550.00**	7.38	9.15	2-4	2-4	28 x47	57¼	36½	47	12	3,450
W-25-8	3,050	**612.50**	8.60	10.65	2-4	2-4	28 x54	57¼	36½	54	12	3,900
W-36-5	3,450	**675.00**	9.38	11.77	2-5	2-5	41½x39	70	56	43½	16	4,380
W-36-6	4,350	**800.00**	11.50	14.69	2-5	2-5	41½x47½	70	56	52	16	5,080
W-36-7	5,200	**925,00**	13.75	17.61	3-5	4-5	41½x56	70	56	60½	16	5,780
W-36-8	6,050	**1,062.50**	16.00	20.54	3-5	4-5	41½x64½	70	56	69	16	6,480
W-36-9	6,950	**1,187.50**	18.25	23.46	4-5	4-5	41½x73	70	56	77½	16	7,180
W-36-10	7,825	**1,300.00**	20.50	26.38	5-5	5-5	41½x81½	70	56	86	16	7,880
W-36-11	8,700	**1,425.00**	22.75	29.30	5-5	5-5	41½x90	70	56	94½	16	8,580
W-36-12	9,575	**1,562.50**	25.00	32.22	5-5	5-5	41½x98½	70	56	103	16	9,280
W-36-13	10,450	**1,687.50**	27.25	35.14	5-5	5-5	41½x107	70	56	111½	16	9,980
W-48-6	8,700	**1,437.50**	17.84	22.38	2-6	2-6	54 x59½	80	67	64½	20	8,850
W-48-7	10,375	**1,687.50**	21.33	26.76	2-6	2-6	54 70	80	67	75	20	10,250
W-48-8	12,050	**1,950.00**	24.84	31.17	3-6	3-6	54 x80½	80	67	85½	20	11,650
W-48-9	13,725	**2,200.00**	28.33	35.55	3-6	3-6	54 x91	80	67	96	20	13,050
W-48-10	15,400	**2,462.50**	31.83	39.94	3-6	3-6	54x101½	80	67	106½	20	14,450

X Add to length to allow for Smoke Hood as follows:—15 and 19 Series, 12 inches—25 and 36 Series, 14 inches—48 Series, 20 inches. 48 Series sections are in halves.

NOTE:—The ratings given provide that all piping in addition to the direct radiation to be used, shall be figured as radiating surface in estimating size of boiler required.

NOTE:—For direct indirect radiation add 30 per cent. For indirect radiation add 60 per cent.

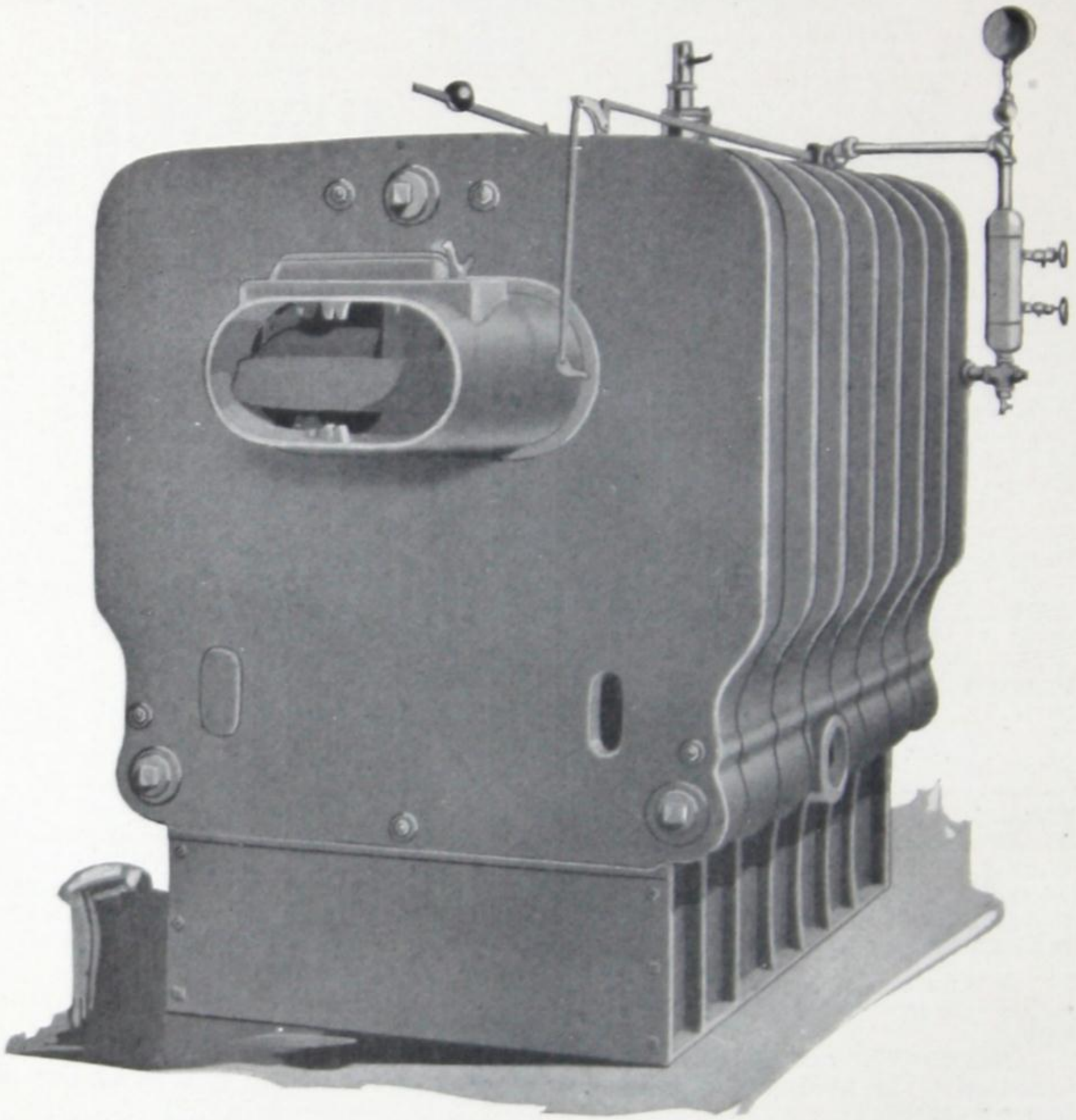
When soft coal is used for fuel, one size large boiler is required than when hard coal is used.

Arranged for pipe coil for heating water for domestic purposes.

NOTE:—For tappings and their location see "Roughing-in Section" page 42.
For measurements see "Roughing-in Section" page 41.

ROYAL

SQUARE SECTIONAL BOILERS

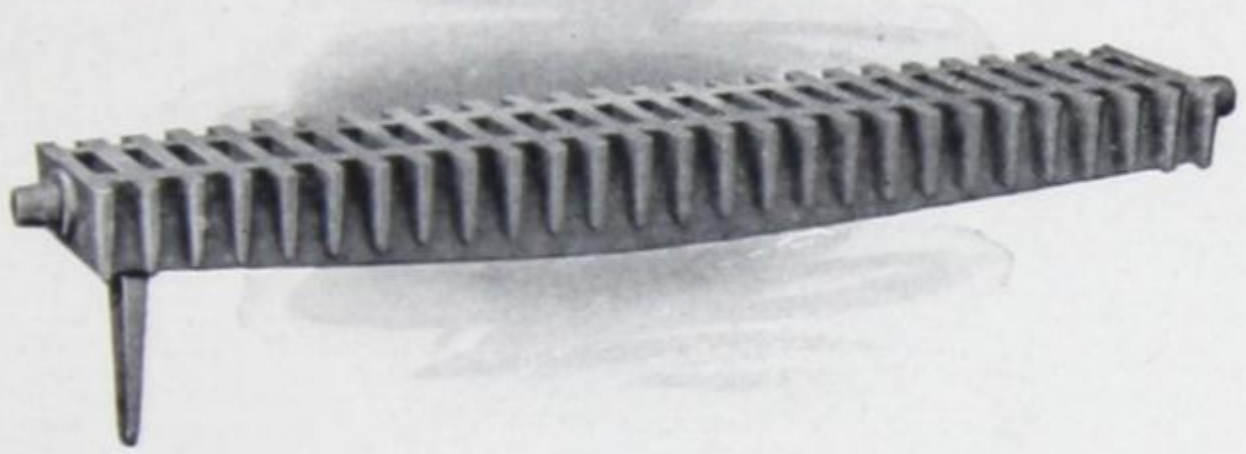


36″ Rear View showing smoke hood and domestic heater openings.

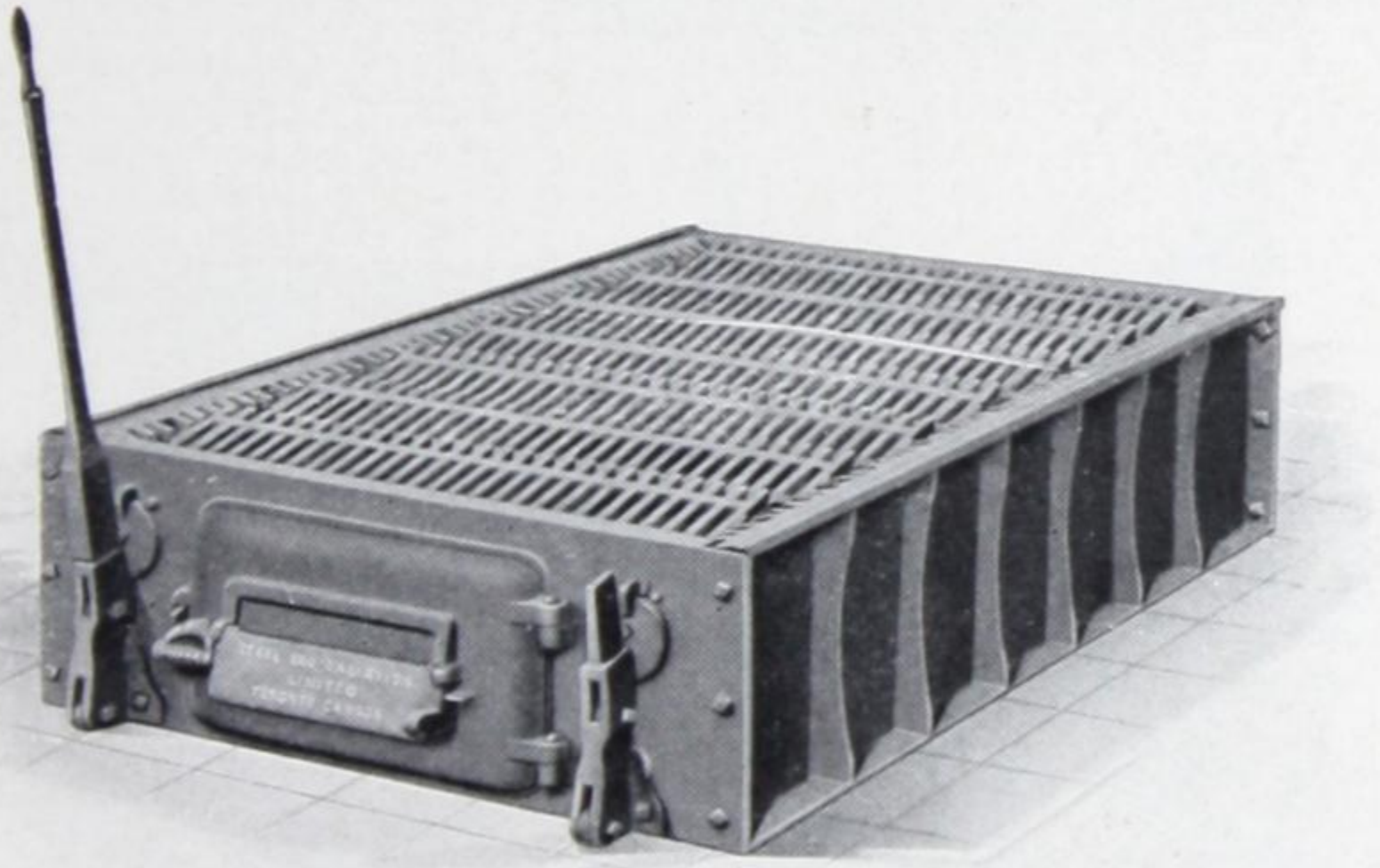
For Measurements, see page 41. For Tappings and Location, see page 42.

ROYAL

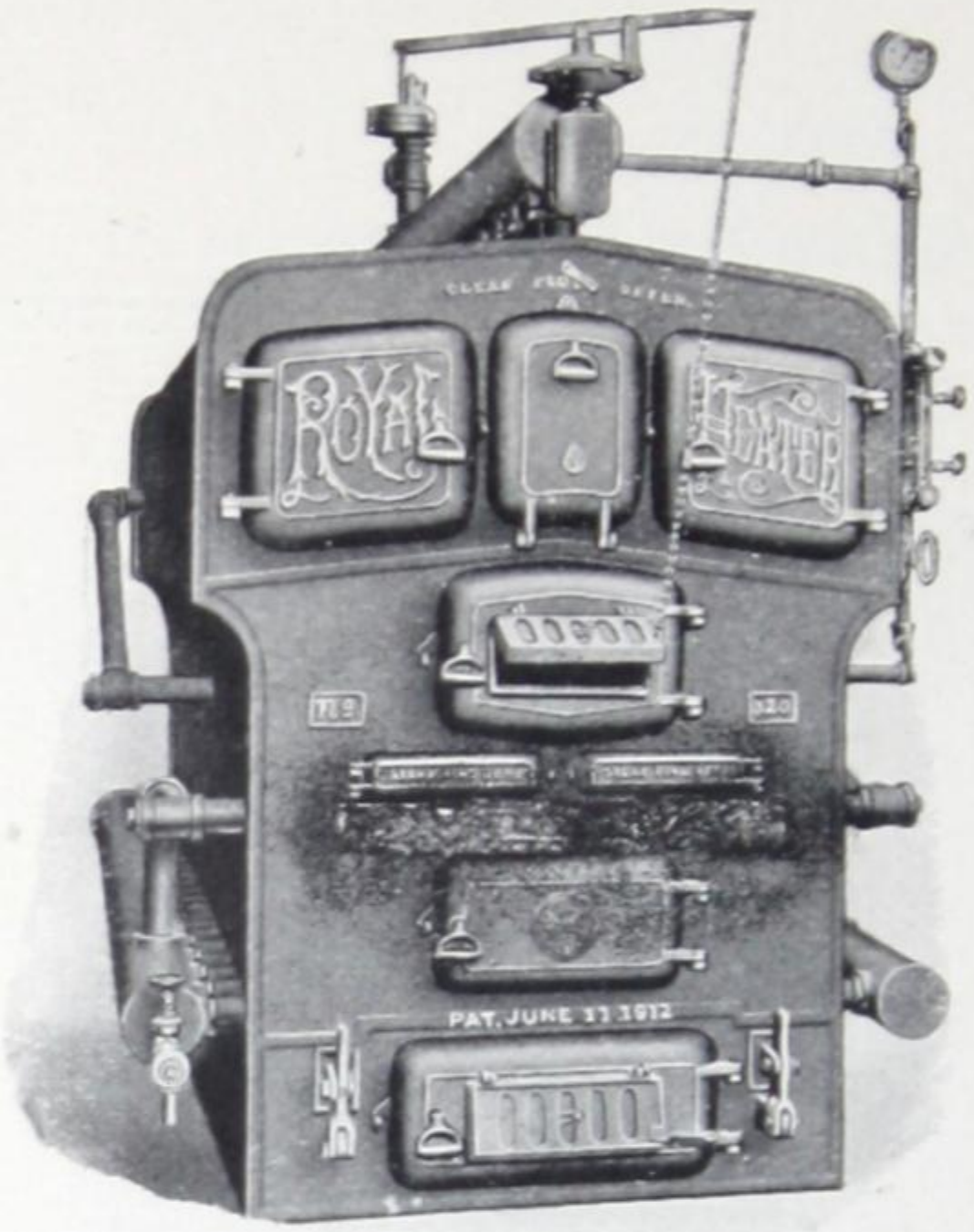
SQUARE SECTIONAL BOILERS



Heavy Trussed Grate Bar in Royal Boilers.



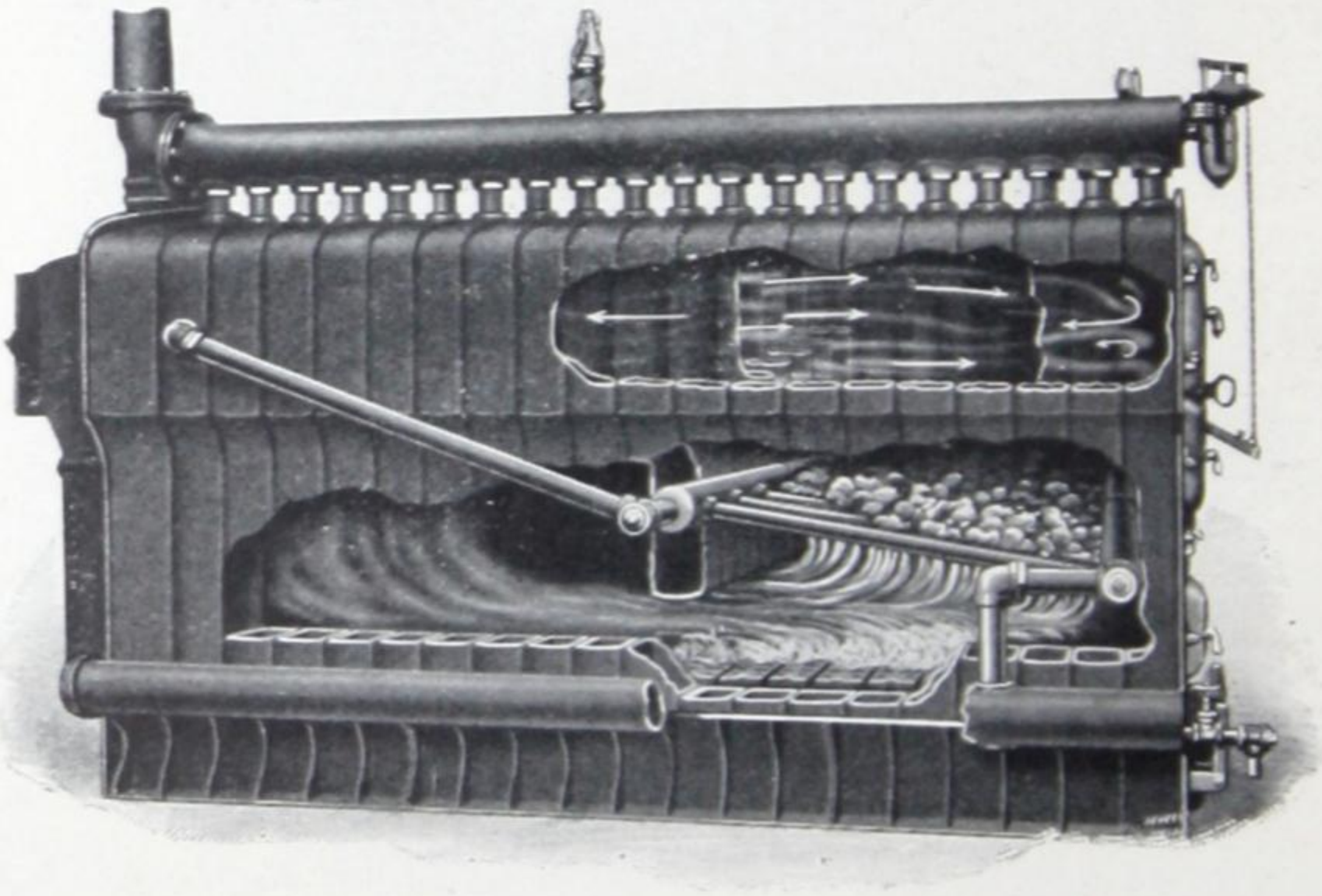
Ashpit of Royal Square Boiler showing Double Shaker,
Grate Stop and Rocking Grates in position.



ROYAL

SMOKELESS STEAM AND WATER BOILERS

No. 320 Royal Smokeless Steam Boiler.



"Sectional view" showing Water Tube Grate, Down Draft and Fire Travel.
For Measurements see Roughing-in section page 43.

ROYAL
SMOKELESS STEAM BOILERS WITH DOWN DRAFT GRATE
PRICES, DIMENSIONS AND CAPACITIES

Size of Boiler	Rating Square Feet	List Price $ cts.	Grate Surface Square Feet	Heating Surface Square Feet	No. and Size of Steam Connections	No. and Size of Return Connect'ns	Height of Water Line	Height of Boiler	Length of Boiler	Width of Boiler	Size of Smoke Pipe	Chimneys and Flues Recommended		No. of Sections
												Round In. Ft.	Square In. Ft.	
S-338	4800	**938.00**	14.23	179	1-5	2-3	63	90	65	60	18	16x 50	16x 50	8
S-339	5400	**1006.00**	17.	200	1-5	2-3	63	90	71	60	18	20x 50	20x 60	9
S-340	6000	**1074.00**	19.65	220	1-5	2-3	63	90	77½	60	18	20x 60	20x 60	10
S-341	6600	**1124.00**	22½	240	1-6	2-4	63	90	84	60	18	20x 60	20x 65	11
S-342	7200	**1218.00**	22½	262	1-6	2-4	63	90	90	60	18	20x 60	20x 65	12
S-343	7800	**1296.00**	25.1	283	1-6	2-4	63	90	96'	60	18	20x 60	20x 75	13
S-344	8600	**1345.00**	25.1	316	1-6	2-4	63	90	102½	60	18	20x 60	20x 75	14
S-345	9200	**1448.00**	28	337	1-6	2-4	63	90	109	60	21	24x 60	24x 65	15
S-346	10000	**1495.00**	28	360	1-6	2-4	63	90	115	60	21	24x 65	24x 70	16
S-347	11000	**1568.00**	28	378	1-6	2-4	63	90	121'	60	21	24x 65	24x 70	17
S-409	9000	**1560.00**	24	324	1-8	2-5	68	99	93	72	21	24x 60	24x 65	9
S-410	10000	**1637.00**	27½	359	1-8	2-5	68	99	100	72	21	24x 60	24x 65	10
S-411	11000	**1756.00**	31.66	394	1-8	2-5	68	99	108	72	21	24x 65	24x 70	11
S-412	12000	**1842.00**	31.66	427	1-8	2-5	68	99	114½	72	21	24x 70	24x 75	12
S-413	13000	**1953.00**	31.66	461	1-8	2-5	68	99	121½	72	21	24x 75	24x 80	13
S-414	14000	**2020.00**	35.50	496	1-8	2-5	68	99	129	72	24	24x 80	24x 85	14
S-415	15000	**2150.00**	35.50	531	1-8	2-5	68	99	136	72	24	24x 85	24x 90	15
S-416	16000	**2325.00**	35.50	565	1-8	2-5	68	99	143	72	24	24x 90	24x100	16
S-548	14000	**2675.00**	37½	511	1-8	2-5	68	108	118	97	24	24x 70	28x 70	8
S-549	15800	**3000.00**	45	573	1-8	2-5	68	108	128½	97	24	24x 70	28x 70	9
S-550	17600	**3363.00**	45	642	1-10	2-5	68	108	138½	97	24	28x 70	32x 70	10
S-551	19400	**3650.00**	45	710	1-10	2-5	68	108	148	97	24	28x 80	32x 80	11
S-552	21000	**3908.00**	52½	773	1-10	2-5	68	108	158'	72	42	28x 90	32x 90	12
S-553	23200	**4133.00**	52½	841	1-10	2-5	68	108	168'	97	24	30x 75	36x 75	13
S-554	25000	**4425.00**	52½	909	1-10	2-5	68	108	179	97	24	30x 80	36x 80	14
S-555	26800	**4646.00**	52½	978	1-10	2-5	68	108	190½	97	24	32x 80	36x 85	15
S-556	28800	**4905.00**	52½	1046	1-10	2-5	68	108	201	97	24	32x 90	36x 90	16
S-557	30800	**5153.00**	52½	1114	1-10	2-5	68	108	211½	97	24	32x100	36x 95	17
S-558	32600	**5385.00**	52½	1183	1-10	2-5	68	108	222	97	24	36x 80	36x100	18

NOTE:—The foregoing ratings provide that all piping (Mains and Risers, Flow and Return) in addition to the direct Radiation to be used, shall be figured as radiating surface in estimating the size of Boiler required. For indirect Radiation add 50 per cent. greater boiler power. Complete trimmings and fire tools furnished with boiler. All of above Boilers are equipped with Top and Side Headers.

For Measurements, see "Roughin-in Section." Page 43.

ROYAL

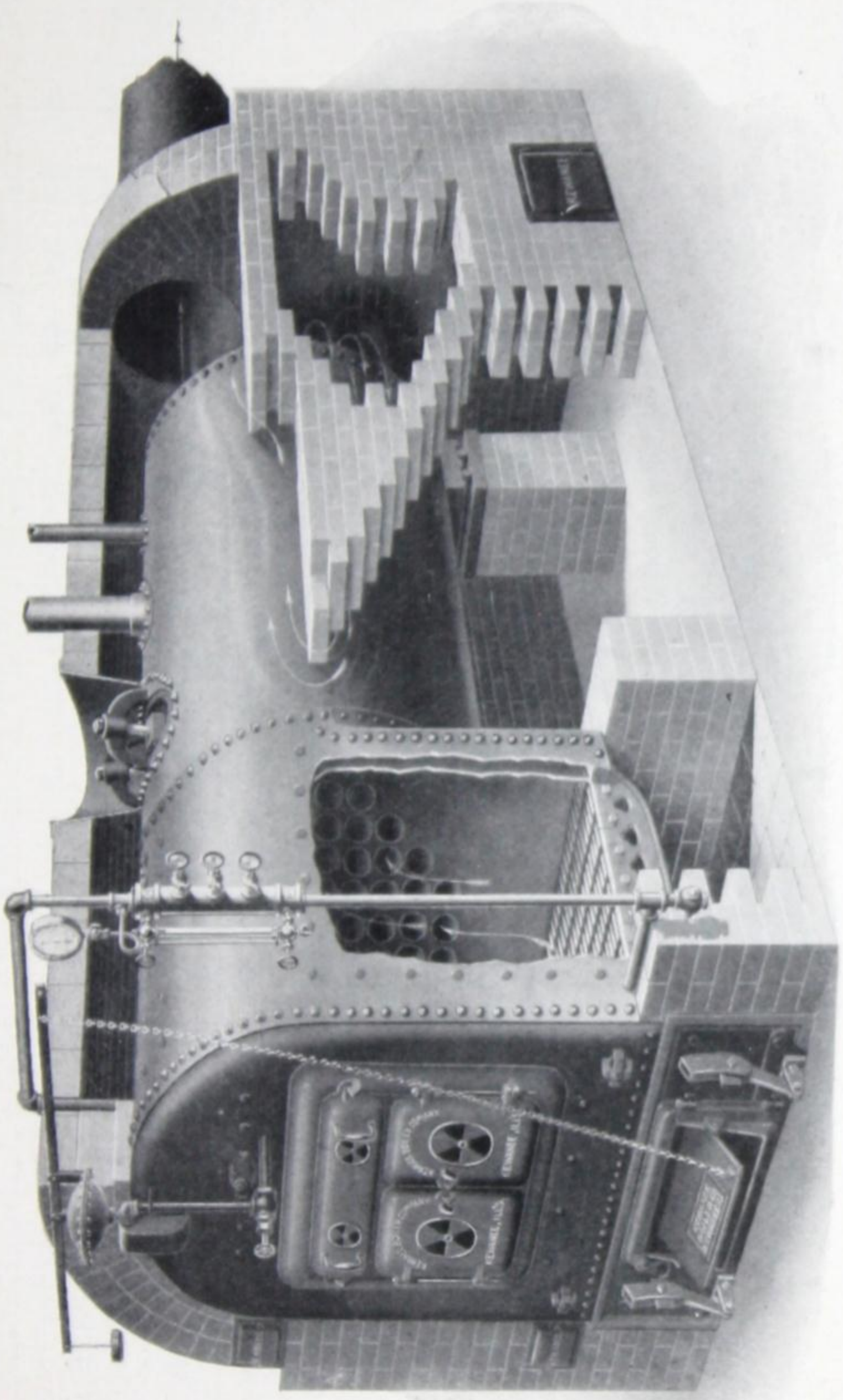
SMOKELESS WATER BOILER WITH DOWN DRAFT GRATE

PRICES, DIMENSIONS AND CAPACITIES

Size of Boiler	Rating Square Feet	List Price	Grate Surface Square Feet	Heating Surface Square Feet	No. and Size of Flow Connections	No. and Size of Return Connect'ns	Height of Boiler	Length of Boiler	Width of Boiler	Size of Smoke Pipe	Chimney Flues Recommended		No. of Sections
											Round In. Ft.	Square In. Ft.	
W–338	7900	**$918.00**	14.23	179	1–7	4–4	90	65	60	18	16x 50	16x 50	8
W–339	8900	**986.00**	17.	200	1–7	4–4	90	71	60	18	20x 50	20x 60	9
W–340	9900	**1054.00**	19.65	220	1–7	4–4	90	77½	60	18	20x 60	20x 60	10
W–341	10900	**1104.00**	22½	240	1–7	4–4	90	84	60	18	20x 60	20x 65	11
W–342	11900	**1198.00**	22½	262	1–7	4–4	90	90	60	18	20x 60	20x 65	12
W–343	12900	**1276.00**	25.1	283	2–6	2–4½ 2–4	90	96¼	60	18	20x 60	20x 75	13
W–344	14200	**1325.00**	25.1	316	2–6	2–4½ 2–4	90	102½	60	18	20x 60	20x 75	14
W–345	15200	**1428.00**	28	337	2–6	2–4½ 2–4	90	109	60	21	24x 60	24x 65	15
W–346	16500	**1475.00**	28	360	2–7	4–4½	90	115	60	21	24x 65	24x 70	16
W–347	18150	**1548.00**	28	378	2–7	4–4½	90	121¼	60	21	24x 65	24x 70	17
W–409	14850	**1540.00**	24	324	2–8	4–6	99	93	72	21	24x 60	24x 65	9
W–410	16500	**1617.00**	27½	359	2–8	4–6	99	100	72	21	24x 60	24x 65	10
W–411	18150	**1736.00**	31.66	394	2–8	4–6	99	108	72	21	24x 65	24x 70	11
W–412	19800	**1822.00**	31.66	427	2–8	4–6	99	114½	72	21	24x 70	24x 75	12
W–413	21450	**1933.00**	31.66	461	2–8	4–6	99	121½	72	21	24x 75	24x 80	13
W–414	23100	**2000.00**	35.50	496	2–8	4–6	99	129	72	24	24x 80	24x 85	14
W–415	24750	**2130.00**	35.50	531	2–8	4–6	99	136	72	24	24x 85	24x 90	15
W–416	26400	**2305.00**	35.50	565	2–8	4–6	99	143	72	24	24x 90	24x100	16
W–548	23100	**2655.00**	37½	511	1–8	2–6	108	118	97	24	24x 70	28x 70	8
W–549	26070	**2980.00**	45	573	1–8	2–6	108	128½	97	24	24x 70	28x 70	9
W–550	29040	**3343.00**	45	642	1–10	3–6	108	138½	97	24	28x 70	32x 70	10
W–551	32010	**3630.00**	45	710	1–10	3–6	108	148	97	24	28x 80	32x 80	11
W–552	34650	**3888.00**	52½	773	1–10	3–6	108	158¾	97	24	28x 90	32x 90	12
W–553	38280	**4113.00**	52½	841	1–10	3–6	108	168¾	97	24	30x 75	36x 75	13
W–554	41250	**4405.00**	52½	909	1–10	3–6	108	179	97	24	30x 80	36x 80	14
W–555	44220	**4626.00**	52½	978	1–10	3–6	108	190½	97	24	32x 80	36x 85	15
W–556	47520	**4885.00**	52½	1046	1–10	3–6	108	201	97	24	32x 90	36x 90	16
W–557	50820	**5133.00**	52½	1114	1–10	3–6	108	211½	97	24	32x100	36x 95	17
W–558	53790	**5365.00**	52½	1133	1–10	3–6	108	222	97	24	36x 80	36x100	18

NOTE:—The foregoing ratings provide that all piping (Mains and Risers, flow and return) in addition to the direct Radiation to be used, shall be figured as Radiating Surface in estimating the size of boiler required. For indirect Radiation add 50 per cent. greater boiler power. Complete trimming and firing tools furnished with boiler. All of above Boilers are equipped with Top and Side Headers. For Measurements, see Roughing-in Section, Page 43.

TYPICAL FIRE BOX BOILER
FOR HEATING



SPECIFICATIONS

TYPICAL FIRE BOX BOILERS

BRICK-SET TYPE

Built in accordance with American Society Mechanical Engineers Code of Boiler Rules

These Boilers will heat all the radiation shown by their capacity

Number of Boiler..	1	2	3	4	5	6	8	9	10	11	12	13	14	15	16	17	18	19	20
Code, Steam Boiler	Dagon	Daft	Daub	Dawn	Dairy	Damp	Dash	Data	Dated	Dead	Dear	Debut	Defer	Devil	Deist	Delve	Demit	Dense	Dart
Code, Water Boiler	Dirty	Deter	Dingy	Dirge	Darn	Debar	Drill	Draft	Degs	Drink	Debut	Decay	Dusk	Decot	Decry	Deflux	Delta	Demon	Dental
Cap., Steam . sq. ft.	900	1050	1200	1400	1700	2000	2600	3000	3500	4000	4500	5500	6500	7500	8700	10000	11000	12000	14000
Cap., Water . sq. ft.	1500	1700	2000	2300	2800	3300	4300	5000	5800	6600	7400	9100	10700	12400	14400	16500	18200	19800	23100
Diam. of Boiler, in.	30	30	30	36	36	36	42	42	48	48	48	54	54	60	60	66	66	72	72
Length of Boiler Over-all.....ft.	6½	7½	8½	7½	9	10½	10	11½	10½	12	13½	14	16½	15½	18	16	18	16	18
Width of Fire-box.....in.	24	24	24	30	30	30	36	36	42	42	42	48	48	53	53	59	59	65	65
Lgth. of fire-box, in.	26	32	38	32	38	44	44	50	44	50	56	56	62	62	68	62	68	68	74
Height of Fire-box.....in.	35	35	35	38	38	38	41	41	44	44	44	49	49	54	54	59	59	64	64
Approx. Wght., lbs.	2400	2700	2900	3300	3700	4200	5400	6000	6700	7300	8000	10600	11900	14400	16000	17800	19100	21700	23500

SPECIFICATIONS TYPICAL FIRE BOX BOILERS BRICK-SET TYPE—*Cont.*

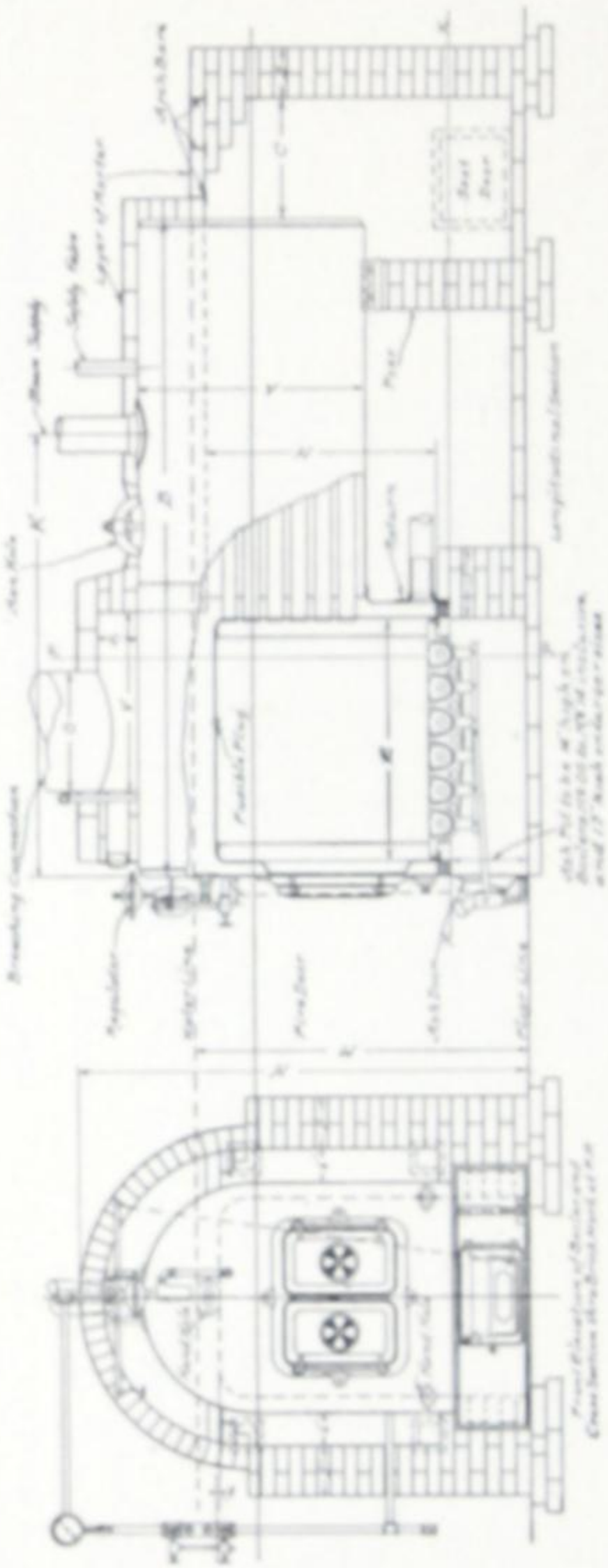
Built in accordance with American Society Mechanical Engineers Code of Boiler Rules

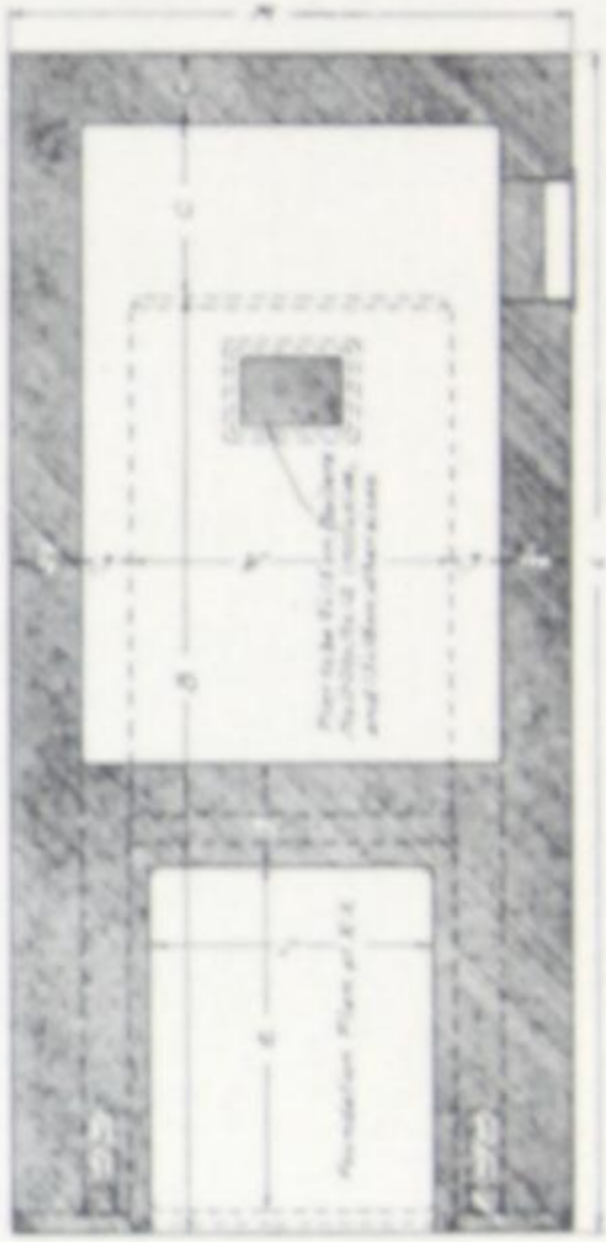
Number of Boiler...	1	2	3	4	5	6	8	9	10	11	12	13	14	15	16	17	18	19	20
Heat. Surface.sq. ft.	113	131	147	180	215	250	305	350	368	420	472	560	673	743	873	954	1080	1167	1329
Area of Grate.sq. ft.	4.4	5.4	6.4	6.8	8.0	9.3	11.1	12.6	12.9	14.7	16.5	18.8	20.8	22.9	25.1	25.5	28,0	30.8	33.5
Dia. of Breech'g..in.	12	14	16	16	18	18	20	22	22	24	24	28	28	32	32	32	32	36	36
Dia. of Stack....in.	12	12	14	14	16	16	18	20	20	22	22	26	26	30	30	30	30	34	34
Min. Ht. of Stack.ft.	40	40	40	40	40	45	45	45	45	50	50	50	50	55	55	60	60	60	60
Dia. of Breeching Two Boilers...in.	18	20	22	22	24	24	28	32	32	32	34	36	36	40	40	40	42	44	46
Dia. of Stack, two Boilers.....in.	18	18	20	20	22	22	26	28	28	30	32	34	34	36	36	36	38	40	42
Min. Ht. of Stack, Two Boilers...ft.	45	45	45	45	45	45	50	50	50	50	50	55	60	60	70	70	70	70	70
Size of Steam Opening.....in.	4	4	5	5	6	6	6	6	6	6	7	7	7	7	7	8	8	8	8
Size of Return...in.	2½	2½	3	3	3	3	4	4	4	4	5	5	5	5	5	6	6	6	6
Size of Safety Valve.....in.	1	1¼	1¼	1¼	1½	1½	2	2	2	2½	2½	2½	3	3	3½	3½	3½	4	4
Ht. of Water-line.in.	52	52	52	55	55	55	58	58	61	61	61	66	66	75	75	80	80	85	85
Ht. from Floor to top of Brick Work in.....	70	70	70	77	77	77	83	83	90	90	90	96	96	108	108	114	114	120	120
L—Total Lt..ft. in.	8–7	9–8	10–8	9–8	11–2	12–8	12–7	14–1	13–1	14–7	16–1	17–0	19–6	18–7	21–1	19–1	21–1	19–5	21–5
W—Total Width.....ft. in.	5–0	5–0	5–0	5–6	5–6	5–6	6–0	6–0	6–6	6–6	6–6	7–8	7–8	8–2	8–2	8–8	8–8	9–2	9–2
Z—Width Double Setting.....ft. in.	9–3	9–3	9–3	10–3	10–3	10–3	11–3	11–3	12–3	12–3	12–3	14–3	14–3	15–3	15–3	16–3	16–3	17–3	17–3
*No. of Com. Brick.	1450	1600	1750	1900	2150	2400	2650	2900	3000	3300	3600	5300	5900	6500	7200	7200	7700	7700	8200
*Com. Brick for Two Boilers.....	2450	2700	2950	3300	3750	4100	4750	5350	5400	5900	6450	8350	10350	11350	12550	12490	13450	13250	13850

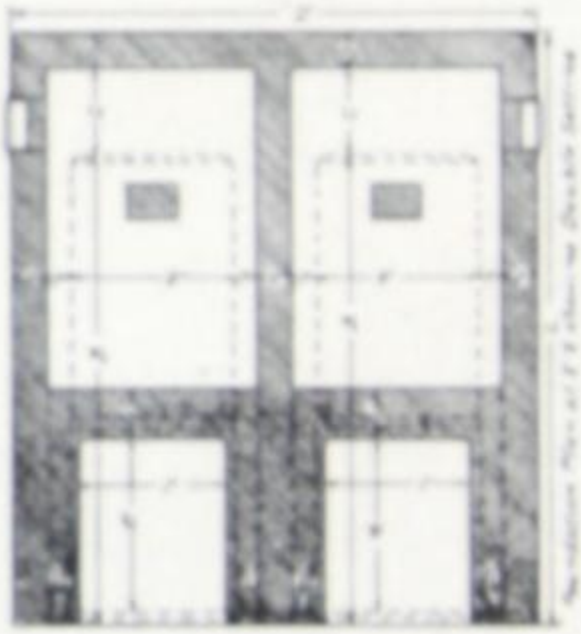
SECTION TYPICAL FIRE BOX BOILER

BRICK SET

Showing Setting with Stack Connection at Front.



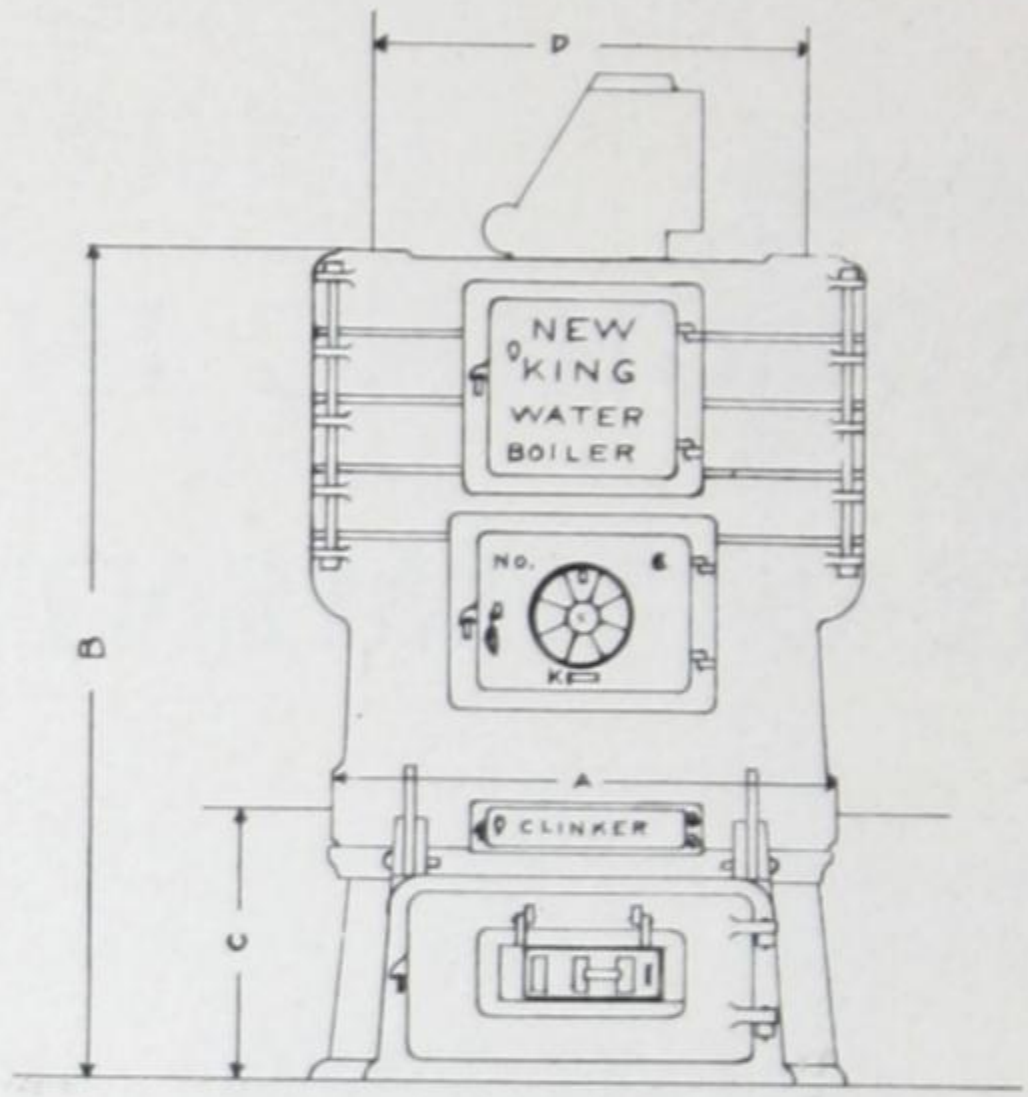




ROUGHING IN MEASUREMENTS FOR BOILERS

NEW KING HOT WATER BOILERS

TAP OUTLET TYPE



A.—Width in inches from left hand return inlet to right hand return inlet.

B.—Distance from floor to top of flow outlets.

C.—Distance from floor to centre of return inlet.

D.—Distance from centre of left hand flow outlet to right hand flow outlet.

For Prices, Ratings, etc., see pages 7, 8

NEW KING

HOT WATER BOILER—LOW BASE

TAP OUTLET TYPE

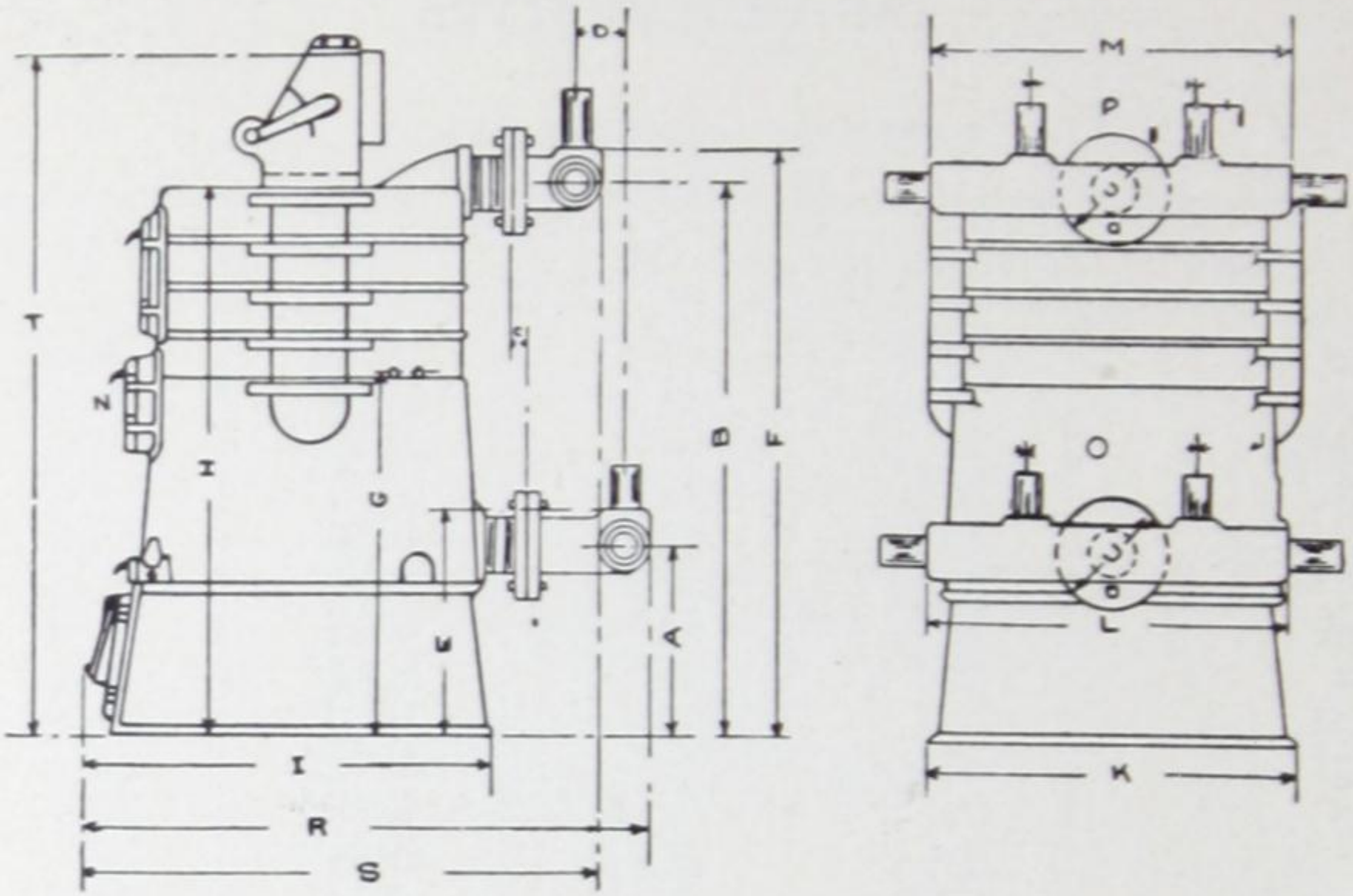
TABLE OF MEASUREMENTS

Size	A	B	C	D
2C	23½″	44″	16½″	19½″
2	23½″	48″	16½″	19½″
2½	23½″	52″	16½″	19½″
3C	25¾″	43″	16½″	21¼″
3	25¾″	47″	16½″	21¼″
3½	25¾″	51″	16½″	21¼″
4C	29″	44″	16½″	24½″
4	29″	48″	16½″	24½″
4½	29″	52″	16½″	24½″
5C	31¼″	47″	18⅝″	26″
5	31¼″	51¼″	18⅝″	26″
5½	31¼″	55½″	18⅝″	26″
6C	33½″	46⅞″	18⅛″	28¾″
6	33½″	50⅞″	18⅛″	28¾″
6-A	33½″	54⅞″	18⅛″	28¾″
6½C	36½″	54″	21½″	31¼″
6½	36½″	59″	21½″	31¼″
6½A	36½″	64″	21½″	31¼″
7C	39″	55″	20¾″	34″
7	39″	60″	20¾″	34″
7½	39″	65″	20¾″	34″
8C	44½″	55¾″	24″	39″
8	44½″	62¼″	24″	39″
8½	44½″	66¾″	24″	39″

NOTE—ADD FOR HIGH BASE:—

No. 2—6¾″; No. 3—7″; No. 4—6 15/16″ No. 5—7⅜″; No. 6—6½″; No. 6½—5 15/16″; No. 7—6⅛″; No. 8—6⅛″.

NEW KING
HOT WATER BOILER
Details of Measurements



Details of Measurements

A Floor to Centre of Return End opening.
B " " " " Flow " "
C Distance Face of Return Flange projects past Face of Flow Flange.
D " Centre of Return opening projects past Centre of Flow opening.
E Floor to Top of Return opening.
F " " " " Flow "
G " " Centre of Domestic Heater openings.
H " " Bottom of Smoke Collar.
I Overall Measurement Front to back of Ash-pit.
K " " Side to Side " "
L " Length of Return Header, Western Header.
M " " Flow Header " "
L " " Branch Return Header.
M " " " Flow "
N Size of Fire Door.
O Distance Centre to Centre Return openings. Western Header.
P " " " Flow " " "
O " " " Branch Return Header openings.
P " " " Branch Flow Header openings.
R Overall Measurement Front of Ash-pit to back of Return Header.
S " " " " " " Flow Header.
T Floor to Top of Draft Control.
U Size and Diameter of Flow and Return Flanges.

NEW KING
HOT WATER BOILER
TABLE OF MEASUREMENTS

No.	A	B	C	D	E	F	G	H	I	K	Western L	Western M	Branch L	Branch M	N	Western O	Western P	Branch O	Branch P	R	S	T	U
2C	16½	43½	5/8	3⅛	19	46½	31	43½	26¾	26¾	18	18	16½	9¼	8 x12	13¾	13¼	11¾	4½	41	37	54½	4x 9
2	16½	47½	5/8	3⅛	19	50½	31	47½	26¾	26¾	18	18	16½	9¼	8 x12	13¼	13¼	11¾	4½	41	37	58½	4x 9
2½	16½	51½	5/8	3⅛	19	54½	31	51½	26¾	26¾	18	18	16½	9¼	8 x12	13¼	13¼	11¾	4½	41	37	62½	4x 9
3C	16½	42½	5/8	3⅛	19	45½	30¼	42½	30	28¾	18	18	16½	9¼	8 x12	13¼	13¼	11¾	4½	42	38	53½	4x 9
3	16½	46½	5/8	3⅛	19	49½	30¼	46½	30	28¾	18	18	16½	9¼	8 x12	13¼	13¼	11¾	4½	42	38	57½	4x 9
3½	16½	50½	5/8	3⅛	19	53½	30¼	50½	30	28¾	18	18	16½	9¼	8 x12	13¼	13¼	11¾	4½	42	38	61½	4x 9
4C	16½	43½	1¼	3¾	19	46½	31⅛	43½	32	30½	18	18	16½	9¼	8 x12	13¼	13¼	11¾	4½	45	41	54¼	4x 9
4	16½	47½	1¼	3¾	19	50½	31⅛	47½	32	30½	18	18	16½	9¼	8 x12	13¼	13¼	11¾	4½	45	41	58¼	4x 9
4½	16½	51½	1¼	3¾	19	54½	31⅛	51½	32	30½	18	18	16½	9¼	8 x12	13¼	13¼	11¾	4½	45	41	62¼	4x 9
5C	18⅝	46½	7/8	5½	21½	49⅜	33	46¼	35	33¼	20½	20½	37	36½	8½x13½	14½	14½	7	7	47	40⅝	65½	5x10
5	18⅝	50¾	7/8	5½	21½	53	33	50½	35	33¼	20½	20½	37	36½	8½x13½	14½	14½	7	7	47	40⅝	69½	5x10
5½	18⅝	55	7/8	5½	21½	57⅞	33	54¾	35	33¼	20½	20½	37	36½	8½x13½	14½	14½	7	7	47	40⅜	73½	5x10
6C	18⅛	46⅜	7/8	5½	21	49½	33¾	46½	38	36½	20½	20½	37	36½	8½x13½	14½	14½	7	7	53	46⅝	65½	5x10
6	18⅛	50⅜	7/8	5½	21	53½	33¾	50½	38	36½	20½	20½	37	36½	8½x13½	14½	14½	7	7	53	46⅝	69½	5x10
6A	18⅛	54⅜	7/8	5½	21	57½	33¾	54½	38	36½	20½	20½	37	36½	8½x13½	14½	14½	7	7	53	46⅝	73½	5x10
6½C	21½	53½	5/8	10½	24	56	37	51¼	44	39½	23½	23½	45	45	9½x15	17	17	7	7	64	53½	69	6x11
6½	21½	58½	5/8	10½	24	61	37	56¼	44	39½	23½	23½	45	45	9½x15	17	17	7	7	64	53½	74	6x11
6½A	21½	63½	5/8	10½	24	66	37	60¼	44	39½	23½	23½	45	45	9½x15	17	17	7	7	64	53½	79	6x11
7C	20¾	54½	5/8	10½	23½	56¾	36¾	52¾	44½	41½	23½	23½	56½	56½	9¼x15	17	17	6¼	6¼	62½	51½	70¼	6x11
7	20¾	59½	5/8	10½	23½	61¾	36¾	57¾	44½	41½	23½	23½	56½	56½	9¼x15	17	17	6¼	6¼	62½	51½	75¼	6x11
7½	20¾	64½	5/8	10½	23½	66¾	36¾	62¾	44½	41½	23½	23½	56½	56½	9¼x15	17	17	6¼	6¼	62½	51½	80¼	6x11
8C	24	55¼	2	10½	26¼	58½	37½	54	52	46½	24½	24½	69	69	9½x16	18¼	18¼	6¼	6¼	73	62½	70¼	7x12½
8	24	61¾	2	10½	26¼	64	37½	59¾	52	46½	24½	24½	69	69	9½x16	18¼	18¼	6¼	6¼	73	62½	76¾	7x12½
8½	24	66¼	2	10½	26¼	68½	37½	64¼	52	46½	24½	24½	69	69	9½x16	18¼	18¼	6¼	6¼	73	62½	81¼	7x12½

NOTE—For High Base Boilers add to above measurements as follows:
No. 2–6¾″, No. 3–7″, No. 4–6 15/16″, No. 5–7⅜″, No. 6–6½″, No. 6½–5 5/16″[1], No. 7–6⅛″, No. 8–6⅛″.

For Prices and Ratings, see Pages 7-8.

NEW KING HOT WATER BOILERS

TABLE OF MEASUREMENTS OF TWIN CONNECTIONS—LOW BASE

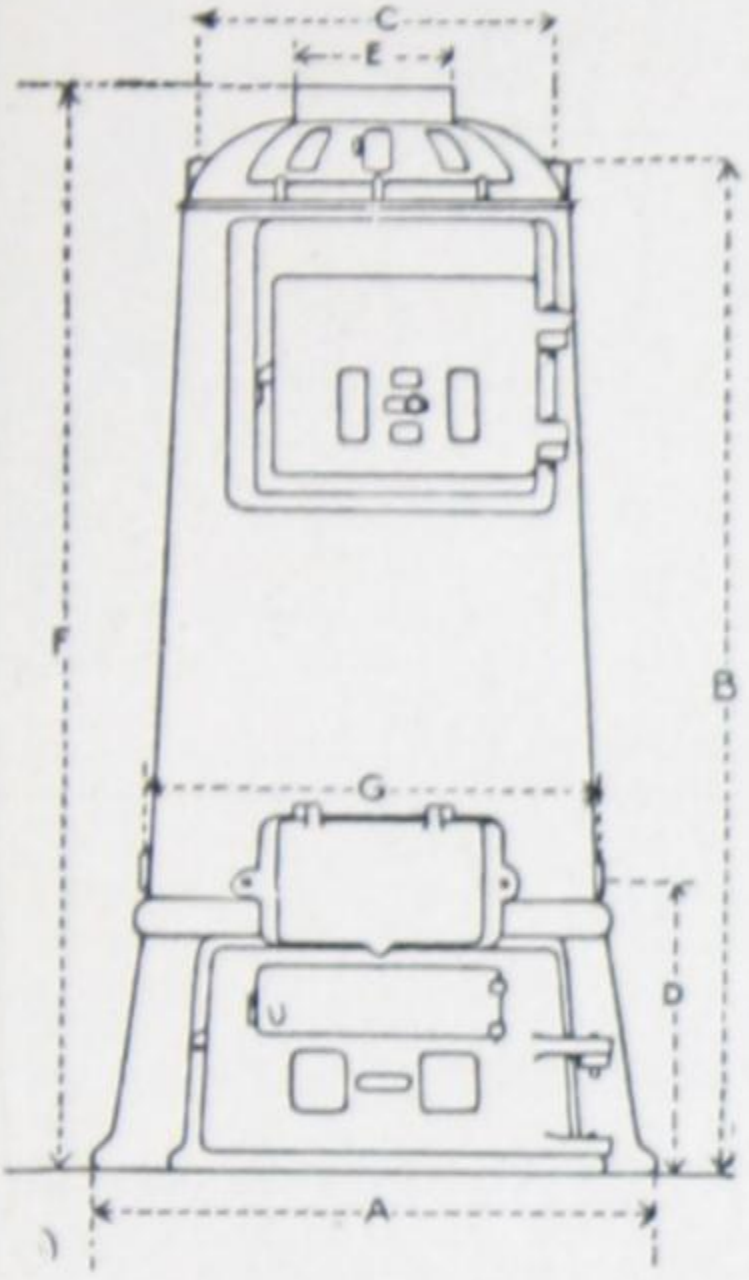
Size of Boiler	No. and Size of Outlets	Valves		Diameter of Flanges	Length of Header		Inside Diam. of Header	C to C of Flanges on Flow Header	C to C of Flanges on return Header	C to C of Flanges Flow and Return Header	Floor to centre of end opening		Floor to top of Headers		Space Occupied		Distance betw'n Boiler Bases	Distance face of return flange projects past face of Flow flange	Dis. centre of return opening projects past centre of Flow opening	Size of expansion Pipe
		No.	Size Inches		Flow Inches	Return Inches					Flow Inches	Return Inches	Flow Inches	Return Inches	Width Inches	Depth Inches				
2C	2–2	4	4	9	44	44	4	34	34	27	43 ½	16 ½	46	19	58	54 ½	6		11	1
2 2 3C	2–2	4	4	9	44	44	4	34	34	31	47 ½	16 ½	50	19	58	58 ½	6		11	1
3 3 4C	2–2	4	4	9	44	44	4	34	34	35	51 ½	16 ½	54	19	58	62 ½	6		11	1
4 4 5C	10–2	4	4	9	58 ¼	58 ¼	4	41	41	26	42 ½	16 ½	45	19	71	53 ½	11		11	1
5	10–2	4	4	9	58 ¼	58 ¼	4	41	41	30	46 ½	16 ½	49	19	71	57 ½	11		11	1
5 ½	10–2	4	4	9	58 ¼	58 ¼	4	41	41	34	50 ½	16 ½	53	19	71	61 ½	11		11	1
6C	10–2	4	4	9	58 ¼	58 ¼	4	41	41	27	43 ½	16 ½	46	19	73 ½	54 ¼	8	1	12	1
6	10–2	4	4	9	58 ¼	58 ¼	4	41	41	31	47 ½	16 ½	50	19	73 ½	58 ¼	8	1	12	1
6A	10–2	4	4	9	58 ¼	58 ¼	4	41	41	35	51 ½	16 ½	54	19	73 ½	62 ¼	8	1	12	1
6 ½C	12–2	4	5	10	72 ¼	72 ¼	5	45 ½	45 ½	27 ⅞	46 ½	18 ⅝	49 ½	21 ⅝	80	65 ½	10		11	1
6 ½	12–2	4	5	10	72 ¼	72 ¼	5	45 ½	45 ½	32 ⅛	50 ¾	18 ⅝	53 ¾	21 ⅝	80	69 ½	10		11	1
6A	12–2	4	5	10	72 ¼	72 ¼	5	45 ½	45 ½	36 ⅜	55	18 ⅝	58	21 ⅝	80	73 ½	10		11	1
7C	12–2	4	5	10	72 ¼	72 ¼	5	45 ½	45 ½	28 ¼	46 ⅜	18 ⅛	49 ⅜	21 ⅛	82 ½	65 ½	8	1	11	1
7	12–2	4	5	10	72 ¼	72 ¼	5	45 ½	45 ½	32 ¼	50 ⅜	18 ⅛	53 ⅜	21 ⅛	82 ½	69 ½	8	1	11	1
7A	12–2	4	5	10	72 ¼	72 ¼	5	45 ½	45 ½	36 ¼	54 ⅜	18 ⅛	57 ⅜	21 ⅛	82 ½	73 ½	8	1	11	1
8C	14–2	4	6	11	86 ¼	86 ¼	6	54	54	32	54 7/16	20 ⅛	58 ⅝	23 ⅞	98	67	10		10	1
8	14–2	4	6	11	86 ¼	86 ¼	6	54	54	37	59 ¾	20 ⅛	63 ¼	23 ⅝	98	67	10		10	1
8A	14–2	4	6	11	86 ¼	86 ¼	6	54	54	42	64 ⅝	20 ⅛	68 ⅛	23 ⅝	98	67	10		10	1
9C	16–2	4	6	11	100 ½	100 ½	6	57	57	33 ¾	54 ½	20 ¾	58	23 ¾	100 ½	52 ¾	12		11	1
9	16–2	4	6	11	100 ½	100 ½	6	57	57	38 ¾	59 ½	20 ¾	63	23 ¾	100 ½	57 ¾	12		11	1
9 ½	16–2	4	6	11	100 ½	100 ½	6	57	57	43 ¾	64 ½	20 ¾	68	23 ¾	100 ½	62 ¾	12		11	1
10C	20–2	4	7	12 ½	128 ¼	128 ¼	7	65	65	31 ¼	57 ⅝	21 ⅛	61 ¾	25 ⅛	128 ½	83	19		10	1
10	20–2	4	7	12 ½	128 ¼	128 ¼	7	65	65	37 ¾	62 7/8	21 ⅛	66 7/8	25 ⅛	128 ½	83	19	2	10	1
10A	20–2	4	7	12 ½	128 ¼	128 ¼	7	65	65	42 ¼	68	21 ⅛	72	25 ⅛	128 ½	83	19	2	10	1
11C	20–2	4	7	12 ½	128 ¼	128 ¼	7	88	88	37	57 ¾	21 ⅛	61 ¾	25 ⅛	166 ¾	87	38	2	10	1
11	20–2	4	7	12 ½	128 ¼	128 ¼	7	88	88	42 ⅛	62 7/8	21 ⅛	66 7/8	25 ⅛	166 ¾	87	38	2	10	1
11 ½	20–2	4	7	12 ½	128 ¼	128 ¼	7	88	88	47 ¼	68	21 ⅛	72	25 ⅛	166 ¾	87	38	2	10	1

NOTES:—Space occupied. Width means distance between outside of Bases. Depth means distance from front of Ashpit to back of Return Header. Standard centre of Header Tappings:—2″ outlets 7″ centres. 2½″ outlets 8½″ centres, 3″ outlets 10½″ centres, 3½″ outlets 12″ centres, 4″ outlets 13″ centres, 4½″ outlets 14″ centres, 5″ outlets 15″ centres, 6″ outlets 18″ centres.

The above measurements are for Low Base Boilers. For High Base Boilers add follows:—No. 2C to 2½–6¼″, No. 3C to 3½–7″, No. 4C to 4½–6 15/16″, No. 5C to 5½–7⅛″, No. 6C to 6A–6½″, No. 7C to 7½–6⅝″, No. 8C to –8½–6½″, No. 9C to 9½–6⅝″, No. 10C to 10A–6¾″, No. 11C to 11½–6¾″.

For Prices, Capacities, etc., see pages 37 & 38.

ROYAL
WATER AND LAUNDRY HEATERS



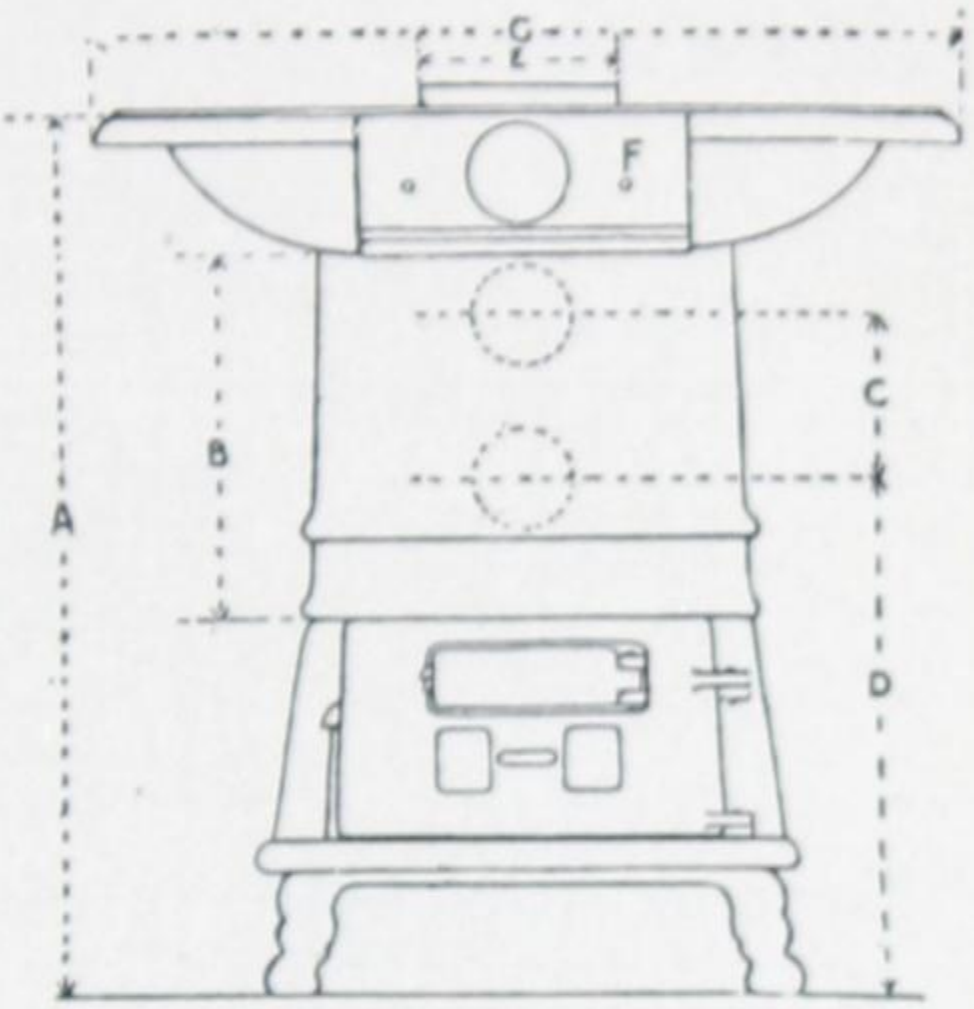


TABLE OF MEASUREMENTS AS INDICATED ON SKETCH ABOVE

No.	A	B	C	D	E	F	G
0	18	23	.....	$9\frac{3}{8}$	5	$24\frac{1}{2}$	.....
10	18	29	.....	$9\frac{1}{2}$	5	32	.....
12	20	31	.....	10	4x6 oval	34	.....
112	20	$35\frac{1}{4}$	.....	10	4x6 oval	38	.....
15	23	$36\frac{3}{4}$	.....	$14\frac{3}{4}$	$4\frac{1}{2}$x7 oval	40	.....
115	23	41	.....	$14\frac{3}{4}$	$4\frac{1}{2}$x7 oval	45	.....
18	$24\frac{1}{2}$	42	$17\frac{3}{4}$	14″	7″ Rd.	$47\frac{1}{2}$	$24\frac{3}{4}$″
118	$24\frac{1}{2}$	$48\frac{1}{2}$	$17\frac{3}{4}$	14″	7″ “	54″	$24\frac{3}{4}$″

ROYAL LAUNDRY HEATER

No.	A	B	C	D	E	F	G
1	27	12	$6\frac{7}{8}$	$14\frac{1}{4}$	$4\frac{1}{2}$ x 7	$5\frac{1}{4}$x$9\frac{3}{4}$	$27\frac{1}{2}$

NOTE:—On No. 0 and 10, 1 Flow opening is on top of Firepot at back, 1 Return opening on side.

On No. 12, 112, 15, 115, 1 Flow opening is on top of Fire pot in centre. Also 1 Return opening on Back of Fire pot.

No. 18 and 118 have 3–2″ flow openings on top of heater and 3–2″ corresponding return inlets at back and sides of heater.

For prices and capacities see Pages 14-15-16

ROYAL
ROUND STEAM BOILERS

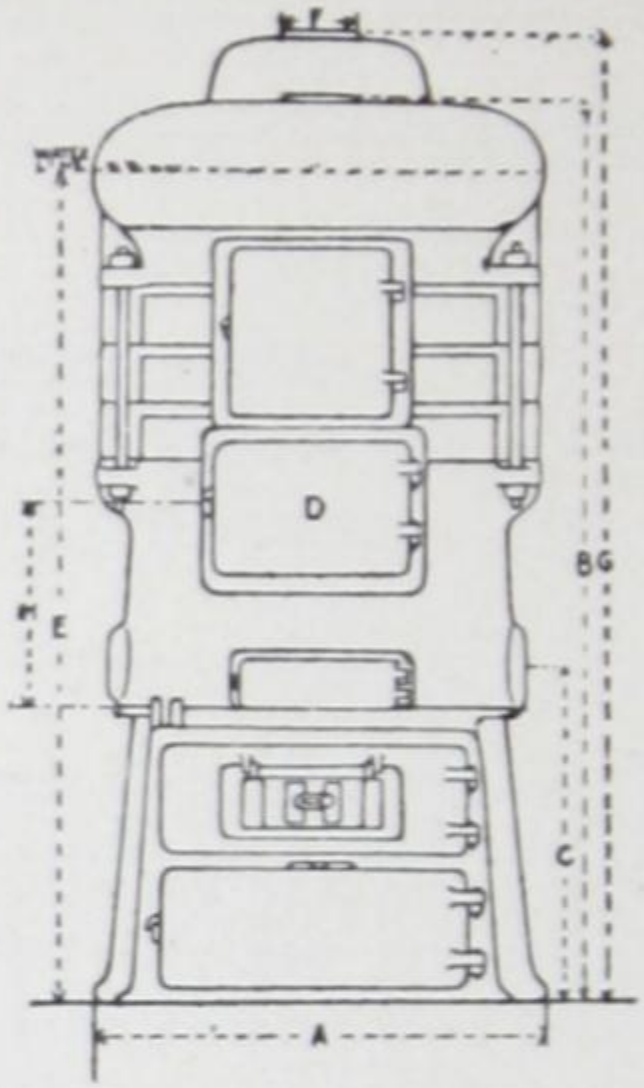


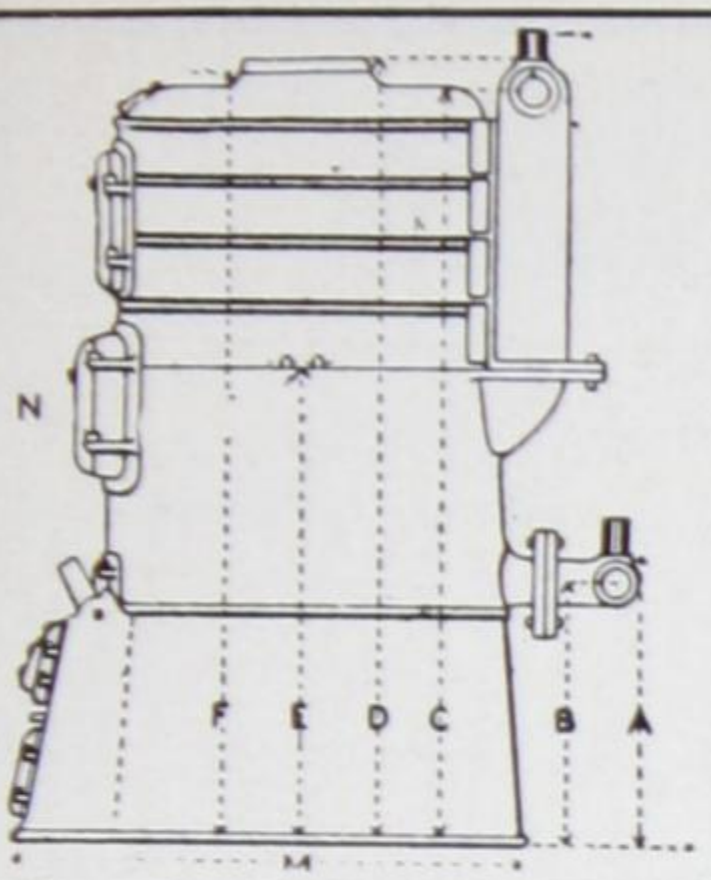
TABLE OF MEASUREMENTS AS INDICATED ON SKETCH ABOVE

No.	A	B	C	D	E	G	H
3-19-S	28	49 1/8	15 3/4	8 x12	41 1/2	57	15
4-19-S	28	53 1/8	15 3/4	8 x12	45 1/2	61	15
5-19-S	28	57 1/8	15 3/4	8 x12	49 1/2	65	15
4-22-S	30	55	15 1/4	8 x12	44 1/2	62	15
5 22-S	30	59	15 1/4	8 x12	48 1/2	66	15
4-25-S	32	55	15 3/4	8 x12 1/4	45 1/2	62	15 5/8
5-25-S	32	59	15 3/4	8 x12 1/4	49 1/2	66	15 5/8
3-28-S	40	56 3/4	17 1/4	9 x14	44 1/2	63 1/4	16 1/2
4-28-S	34 3/4	61 1/4	17 1/4	9 x14	48 1/2	68 1/4	16 1/2
5-28-S	34 3/4	65 3/4	17 1/4	9 x14	52 1/2	72 3/4	16 1/2
4-31-S	37	62 1/4	19 1/2	9 1/2 x15 1/2	48 1/2	70 1/4	17
5-31-S	37	66 3/4	19 1/2	9 1/2 x15 1/2	52 1/2	79 3/4	17
4-34-S	40	69 1/4	20	9 1/2 x15 1/2	56	76 1/4	18
5-34-S	40	70	20	9 1/2 x15 1/2	60 3/4	82	18

NOTE:—The above measurements are for Low Base Boilers. To arrive at height of high Base Boilers, add as follows:—

19 in. Boilers 6 3/4 in.
22 in. Boilers 6 3/4 in.
25 in. Boilers 6 3/4 in.
28 in. Boilers 7 1/4 in.
31 in. Boilers 7 in.
34 in. Boilers 8 in.

For Prices and Capacities see Boiler Section Pages 17-18.



KING

HOT WATER BOILERS

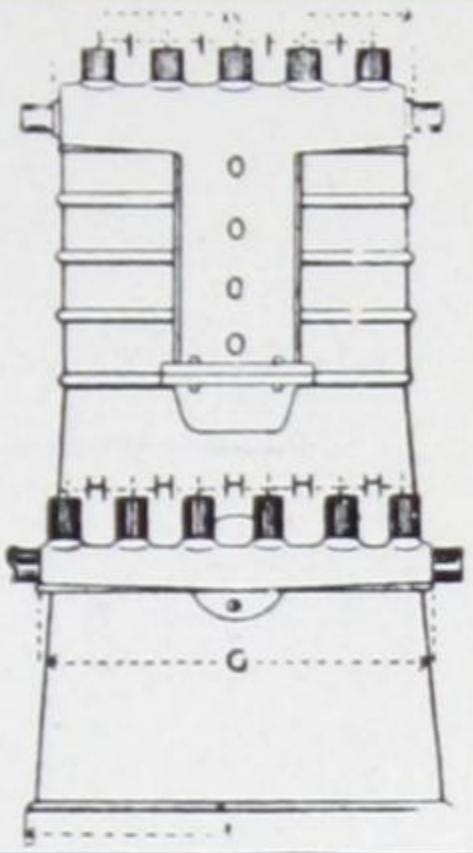


TABLE OF MEASUREMENTS

	No.	A	B	C	D	E	F	G	H	I	K	L	M	N
HIGH BASE	1	25	22½	51 3/16	53 5/8	37 5/16	51 7/8	16 1/8	11	5½	10¾	28	29	8 x12
	2	25	22½	55	57½	37 5/16	55 7/8	16 1/8	11	5½	10½	28	29	8 x12
	2½	25	22½	59	61½	37 5/16	59¾	16 1/8	11	5½	10½	28	29	8 x12
	3	25	22½	54¾	57 1/8	36 7/8	55¾	16 1/8	11	5½	10½	30¼	31¾	8 x12
	3½	25	22½	58½	61	36 7/8	59 11/16	16 1/8	11	5½	10½	30¼	31¾	8 x12
	4	25¼	22 11/16	55½	58	37¾	56½	16 1/8	11	5½	10½	31¾	33⅜	8 x12
	4½	25¼	22 11/16	59⅜	61⅞	37¾	60⅜	16 1/8	11	5½	10½	31¾	33⅜	8 x12
	5	27½	24¾	60⅞	63	40¼	61	24 1/8	6½	6½	30¾	35	36	8½x13½
	5½	27½	24¾	65¼	67½	40¼	64⅝	24 1/8	6½	6½	30¾	35	36	8½x13½
	6	26½	24	61	63¼	40¼	60¾	24 1/8	6½	6½	30¾	37¾	39½	8½x13½
	6A	26½	24	65½	67¾	40¼	65¼	24 1/8	6½	6½	30¾	37¾	39½	8½x13½
	6½	29¾	27¼	67¼	69½	42⅜	64¾	45	7	7	45¼	40¼	43¼	9¼x15
	6½A	29¾	27¼	71¾	74	42⅜	69½	45	7	7	45¼	40¼	43¼	9¼x15
	7	29¾	27¼	67⅜	69⅝	42½	65⅛	56½	6¼	6¼	56½	42½	46	9¼x15
	7½	29¾	27¼	72¼	74½	42½	70	56½	6¼	6¼	56½	42½	46	9¼x15
	8	31⅛	28¾	70½	72¾	43½	68⅜	68⅞	6¼	6¼	68⅞	47¾	51	9½x16
	8½	31⅛	28¾	75¾	77⅞	43½	73¼	68⅞	6¼	6¼	68⅞	47¾	51	9½x16
	9	31½	29⅛	71	73¼	43½	68	68⅞	6¼	6¼	68⅞	50	53½	9½x16
	9½	31½	29⅛	76	78¼	43½	73	68⅞	6¼	6¼	68⅞	50	53½	9½x16
LOW BASE	1	18¼	15¾	44 7/16	46⅞	30 9/16	45⅛	16 1/8	11	5½	10¾	26½	27½	8 x12
	2	18¼	15¾	48 5/16	50⅞	30 9/16	49	16 1/8	11	5½	10½	26½	27½	8 x12
	2½	18¼	15¾	52¼	54¾	30 9/16	53	16 1/8	11	5½	10½	26½	27½	8 x12
	3	18	15½	47¾	50¼	30⅛	49	16 1/8	11	5½	10½	28¾	29¾	8 x12
	3½	18	15½	51⅝	54⅛	30⅛	53	16 1/8	11	5½	10½	28¾	29¾	8 x12
	4	18¼	15¾	48⅝	51⅛	30⅞	49⅝	16 1/8	11	5½	10½	30¼	31⅝	8 x12
	4½	18¼	15¾	52½	54⅞	30⅞	53⅝	16 1/8	11	5½	10½	30¼	31⅝	8 x12
	5	20	17⅜	53½	55¾	32¾	53⅜	24 1/8	6½	6½	30¾	33½	34¾	8½x13½
	5½	20	17⅜	58	60¼	32¾	57⅝	24 1/8	6½	6½	30¾	33½	34¾	8½x13½
	6	20	17½	54½	56¾	33¼	54¼	24 1/8	6½	6½	30¾	36½	38	8½x13½
	6A	20	17½	59	61¼	33¼	58⅝	24 1/8	6½	6½	30¾	36½	38	8½x13½
	6½	23¾	21 5/16	61¼	63½	36¼	59	45	7	7	45¼	39⅜	42	9¼x15
	6½A	23¾	21 5/16	66	68⅜	36¼	63⅝	45	7	7	45¼	39⅜	42	9¼x15
	7	23½	21⅛	61	63⅜	36¼	59	56½	6¼	6¼	56½	41	44	9¼x15
	7½	23½	21⅛	65⅞	68¼	36¼	63¾	56½	6¼	6¼	56½	41	44	9¼x15
	8	25	22⅝	64⅜	63½	37⅜	61⅞	68⅞	6¼	6¼	68⅞	46⅛	49⅝	9½x16
	8½	25	22⅝	69½	71⅝	37⅜	67¼	68⅞	6¼	6¼	68⅞	46⅛	49⅝	9½x16
	9	25⅛	22¾	64⅞	67⅛	37⅜	61⅞	68⅞	6¼	6¼	68⅞	48¾	52¼	9½x16
	9½	25⅛	22¾	70	72¼	37⅜	67	68⅞	6¼	6¼	68⅞	48¾	52¼	9½x16

NOTE:—For Prices and Capacities see Repair Section Pages 45-46

ROYAL

SQUARE SECTIONAL BOILERS

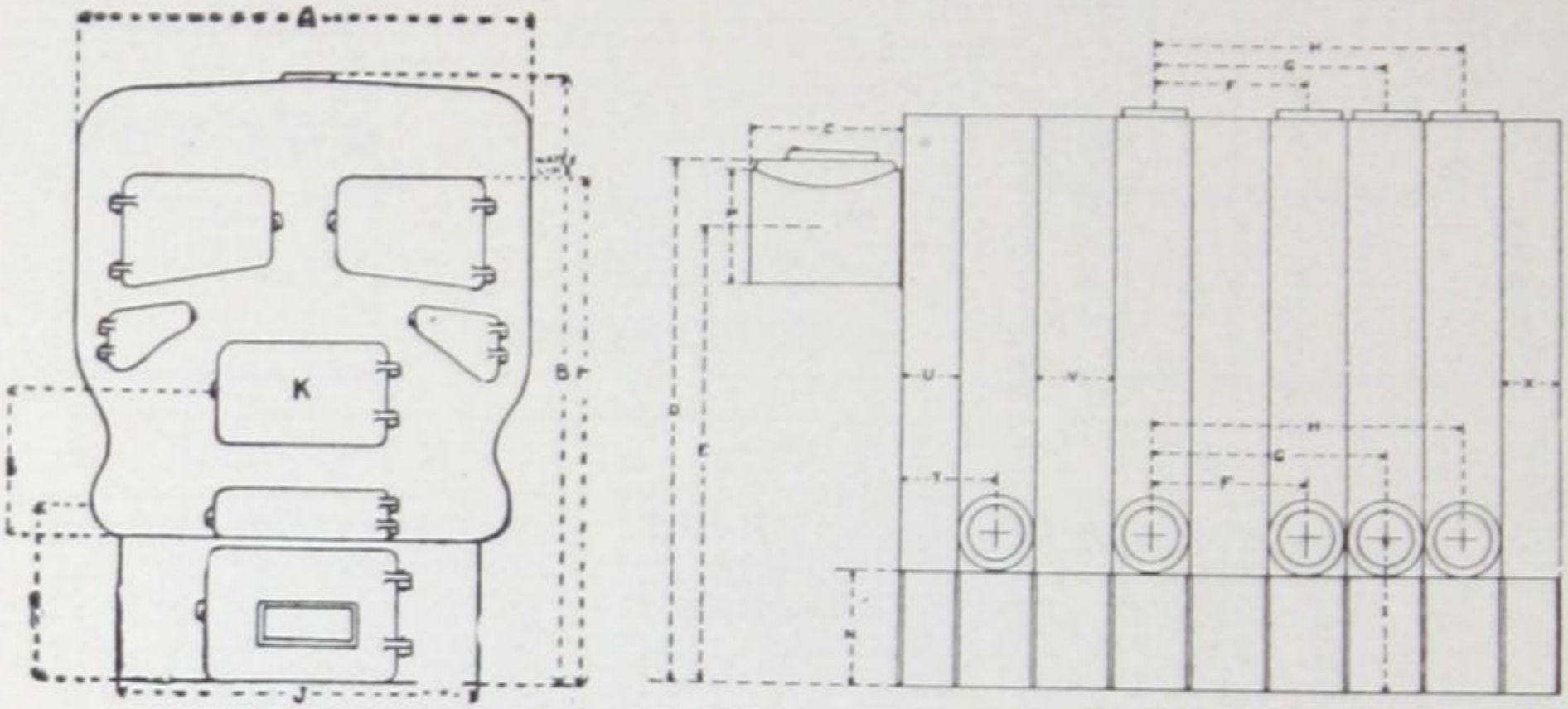


TABLE OF MEASUREMENT AS INDICATED ON SKETCH ABOVE

	19-inch Boilers		25-inch Boilers		36-inch Boilers		48-inch Boilers	
	Steam	Water	Steam	Water	Steam	Water	Steam	Water
A	33 ½	33 ½	36	36 ½	56	56	67	67
B	51 ½	51 ½	57 ½	57 ½	71	71	81	81
C	12 ½	12 ½	14	14	14	14	19 ½	19 ½
D	45	45	49	49	59	59	67	67
E	39	39	42	42	52	52	58 ½	58 ½
F	13 ½	13 ½	14	14	17	17	21	21
G	19 ½	19 ½	21	21	25 ½	25 ½	31 ½	31 ½
H	27	27	28	28	34	34	42	42
I	16 ½	16 ½	16 ½	16 ½	19	19	20 ½	20 ½
J	22	22	28	28	42	42	55	55
K	8 ½x13	8 ½x13	10x16	10x16	13x20	13x20	11x17	11x17
M	43 ¼	....	47 ¼	....	57 ½	....	68	
N	12 ½	12 ½	12 ½	12 ½	14 ½	14 ½	14 ½	14 ½
P	9	9	11 ½	11 ½	11	11	15 ½	15 ½
S	12 ½	12 ½	14 ½	14 ½	16 ½	16 ½	17	17
T	8 ½	8 ½	9 ½	9 ½	12	12	15	15
U	5 ¾	5 ¾	5 ¾	5 ¾	6 ½	6 ½	....	....
V	6 ½	6 ½	6 ¾	6 ¾	8 ¼	8 ¼	....	....
X	5 ¾	5 ¾	5 ¾	5 ¾	7 ½	7 ½	....	....

NOTE:—For Prices and Capacities see Boiler Section, Pages 19-24.

ROYAL
SQUARE SECTIONAL BOILERS
STANDARD TAPPINGS AND LOCATION

STEAM							WATER						
	Supply			Returns				Supply			Returns		
Size of Boilers	No.	Size Ins.	Located in Sections	No.	Size Ins.	Located in Sections	Size of Boilers	No.	Size Ins.	Located in Sections	No.	Size Ins.	Located in Sections
S–19–5	2	3	2–4	2	3	4	W–19–5	2	3	2–4	2	3	4
S–19–6	2	3	2–4	2	3	4	W–19–6	2	3	2–4	2	3	4
S–19–7	2	3	2–5	2	3	5	W–19–7	2	3	2–5	2	3	5
S–25–5	2	4	2–4	2	4	4	W–25–5	2	4	2–4	2	4	4
S–25–6	2	4	2–4	2	4	4	W–25–6	2	4	2–4	2	4	4
S–25–7	2	4	2–5	2	4	5	W–25–7	2	4	2–5	2	4	5
S–25–8	2	4	3–6	2	4	6	W–25–8	2	4	3–6	2	4	6
S–36–5	2	5	2–4	2	5	4	W–36–5	2	5	2–4	2	5	4
S–36–6	2	5	2–5	2	5	5	W–36–6	2	5	2–4	2	5	4
S–36–7	3	5	2–4–6	2	5	4	W–36–7	3	5	2–4–6	4	5	4–6
S–36–8	3	5	2–5–7	2	5	5	W–36–8	3	5	2–4–7	4	5	4–7
S–36–9	3	5	2–5–8	2	5	5	W–36–9	4	5	2-4-6-8	4	5	2–6
S–36–10	3	5	2–5–8	2	5	5	W–36–10	4	5	2-4-6-8	4	5	2–6
S–36–11	3	5	3–6–9	2	5	6	W–36–11	4	5	2-5-8-10	4	5	5–8
S–36–12	3	5	3–6–9	2	5	6	W–36–12	4	5	2-5-8-10	4	5	5–8
S–36–13	3	5	4–7–10	2	5	7	W–36–13	4	5	2-5-8-11	4	5	5–8

In 19, 25 and 36 in. Boilers, Returns are placed one on each side of same section.

S–48–6	2	6	2–4	..	..	....	W–48–6	2	6	2–4	2	6	2–4
S–47–7	3	6	2–4–6	..	..	....	W–48–7	2	6	3–5	2	6	3–5
S–48–8	3	6	2–4–6	..	..	....	W–48–8	3	6	2–4–6	3	6	2-4-6
S–48–9	3	6	2–5–8	..	..	....	W–48–9	3	6	2–5–8	3	6	2-5-8
S–48–10	3	6	2–5–8	..	..	....	W–48–10	3	6	2–5–8	3	6	2-5-8

Return Inlets in Back.

36 inch have 2–4″ 19 inch have 2–2″
25 “ “ 2–2½″

NOTE:—For Prices and Capacities, see Boiler Section Pages 19-24.

ROYAL
SMOKELESS WATER TUBE BOILERS
All Measurements Taken From Floor
SIDE VIEW MEASUREMENTS

		33″	40″	54″
A	Length over all 11 Section Boiler	84″	108″	148″
B	Length of Ashpit for 11 Sectional Boiler	69″	79″	112″
C	Distance from floor to top of Steam Separator, 54″ only	....	....	108″
D	Distance from Centre of Side Header to Bottom of Steam Separator	....	50½″	59⅝″
E	Height from floor to Centre of Smoke Collar	65″	70″	70″
F	Height from floor to Top of Tee	90″	....	....
G	Distance from floor to Top of Grates, 54″ only	....	....	15″
H	Distance from Centre to Centre of Sections	6⅛″	7¼″	10⅜″
I	Width of Section	6″	7″	10″
J	Width of Back Section, 54″ only	....	....	8″
K	Depth of Smoke Box	8″	10″	12″
L	Depth of Smoke Collar	4″	4″	3″
M	Diameter of Smoke Collar	18 & 21″	21 & 24″	24″
N	Diameter of Equalizer Pipe	3″	4″	....
O	Depth of Ashpit below Floor	8″	10″	12″
P	Length of Connection to Steam Separator, 54″ only	....	....	17¼″
Q	Size of Steam outlet from Steam Separator No. 558-550-10, No. 549-548-8	....	....	10″ & 8″
R	Size of Tapping for Drip Pipe Connection, 54″ only	....	....	5″
S	Distance from Rear of Side Header to Centre of Steam Separator, 54″ only	....	....	27¼″

FRONT VIEW MEASUREMENTS

		33″	40″	54″
AA	Width of Sections Across Top	46¾″	59″	78″
BB	Width of Boiler Across Lower Front Frame	40″	52″	62½″
CC	Width of Boiler across Side Header	60″	70″	87″
DD	Width of Boiler over all	68″	78″	97″
EE	Height from Floor to Top of Header	90½″	96½″	105″
FF	Height from Floor to Top of Section	78¼″	82″	89″
GG	Height of Water line from Floor	63″	68″	70″
HH	Height of Ashpit sides	15″	13½″	13″
II	Projection of Front Frame below Bottom of Ashpit Base, 54″ only	....	....	2″
JJ	Distance to Centre of Side Header, 54″ only	....	....	12½″
KK	Size of Cleanout Doors "Side"	14 x 15	20 x 18½	13 x 19
LL	Size of Cleanout Doors "Inside," 54″ only	....	....	6 x 19
MM	Size of Cleanout Doors, "Centre"	12½ x 15	13½ x 18½	15 x 18
NN	Size of Feed Doors	21½ x 15¾	21½ x 15	21 x 13
OO	Size of Stoking Doors	13 x 3½	15 x 4	17 x 4
PP	Size of Lower Feed Doors	22 x 12	22 x 12	19 x 12
QQ	Size of Ashpit Doors	22¾ x 12	29 x 13	18 x 11

NOTE.—For Prices and Capacities see Boilers Section Pages 25, 26, 27.

INSTRUCTIONS FOR ORDERING BOILERS AND BOILER REPAIRS

State plainly the catalogue name and number of boiler.

When ordering repair parts for any boilers, give the size, number and catalogue name which is on the front of the boiler. Also give the factory or serial number which is to be found on the brass plate on Fire doors. It is well to mention all letters or numbers which may appear on part required. In case it is impossible to give any of the above information, send a sketch, having dimensions marked on it, and a rough detailed description of parts wanted. Especially mention whether the boiler is round or square. If grate bars are required, always number from the front. When ordering repair sections for round boiler, mention which one numbering from the firepot, for square boiler, from the front and state whether same has any tapped openings and the size of the tapping.

KING
HOT WATER BOILERS

No. 6 King Boiler with High Base

NOTE—This type of Boiler Discontinued.
Repair Parts only Obtainable.

KING
HOT WATER BOILER
LISTS, DIMENSIONS AND CAPACITIES

Size	Net Rating in Sq. Ft. Direct Radiation	Gross Rating in Square Feet	LIST PRICES		Height to Top of Dome		Diameter in Inches of				Depth of Fire Pot	Average Fire Pot Area Sq. Ft.	Average Grate Area Sq. Ft.	No. of Mains Flow and Return	Size of Coal
			High Base	Low Base	High Base	Low Base	Smoke P.	Base Ring	Fire Pot Top	Fire Pot Bottom					
1	250	375	$302.00	$268.00	51 7/8	45 1/8	8	26 1/2	17 1/2	19	16 3/4	182	197	4–2	Stove
2	365	550	**360.00**	**320.00**	55 3/8	49	8	26 1/2	17 1/2	19	16 3/4	182	197	4–2	Stove
2 1/2	420	625	**395.00**	**356.00**	59 3/4	53	8	26 1/2	17 1/2	19	16 3/4	182	197	4–2	Stove
3	500	750	**425.00**	**382.00**	55 3/4	49	8	30	19 3/4	21 1/4	16 3/4	223	246	4–2	Stove
3 1/2	585	875	**465.00**	**425.00**	59 11/16	53	8	30	19 3/4	21 1/4	16 3/4	223	246	4–2	Stove
4	685	1,025	**505.00**	**462.00**	56 1/2	49 5/8	8	31	22 1/2	24	17 1/4	295	314	4–2	Stove
4 1/2	750	1,125	**545.00**	**498.00**	60 3/8	53 5/8	8	31	22 1/2	24	17 1/4	295	314	4–2	Stove
5	835	1,250	**603.00**	**550.00**	61	53 3/8	10	35	24 1/2	26	18 1/2	348	369	6–2	" or Egg
5 1/2	935	1,400	**651.00**	**590.00**	64 5/8	57 5/8	10	35	24 1/2	26	18 1/2	348	369	6–2	" or Egg
6	1,000	1,500	**700.00**	**654.00**	60 3/4	54 1/4	10	37 1/2	27	28 1/2	18 3/4	420	443	7–2	Egg
6a	1,100	1,650	**746.00**	**706.00**	65 1/4	55 5/8	10	37 1/2	27	28 1/2	18 3/4	420	443	7–2	Egg
6 1/2	1,250	1,875	**842.00**	**775.00**	64 3/4	59	12	40	29 1/2	31	19 1/2	500	524	8–2	Egg
6 1/2a	1,350	2,025	**905.00**	**840.00**	69 1/2	63 5/8	12	40	29 1/2	31	19 1/2	500	524	8–2	Egg
7	1,500	2,250	**950.00**	**880.00**	65 1/8	59	12	42 1/2	32	33 1/2	19 1/2	585	612	11–2	Egg
7 1/2	1,765	2,650	**1,017.00**	**945.00**	70	63 3/4	12	42 1/2	32	33 1/2	19 1/2	585	612	11–2	Egg
8	2,000	3,000	**1,160.00**	**1,052.00**	68 3/8	61 7/8	12	46 3/4	36 3/4	38 1/4	19 3/8	767	798	13–2	Egg
8 1/2	2,300	3,450	**1,326.00**	**1,210.00**	73 1/4	67 1/4	12	46 3/4	36 3/4	38 1/4	19 3/8	767	798	13–2	Egg
9	2,665	4,000	**1,396.00**	**1,300.00**	68	61 7/8	12	49 1/4	39 1/4	40 3/4	19 3/8	873	906	13–2	Egg
9 1/2	3,000	4,500	**1,600.00**	**1,500.00**	73	67	12	49 1/4	39 1/4	40 3/4	19 3/8	873	906	13–2	Egg

NOTE:—King Boilers will carry the ratings shown above and the mains in addition. No extra charge for Special Headers. All half sizes have five sections above fire pot.

Arranged for pipe coil at either side of heater for water for domestic purposes.

When ordering repairs for King Boilers always refer to Serial number on Fire Door and letter on part to be replaced. For measurements see Roughing-in Section Page 40.

ROYAL
ROUND HOT WATER BOILER
PUSH NIPPLE CONSTRUCTION

No. 4-22-W. Royal Boiler with Low Base

NOTE—This type of Boiler Discontinued.
Repair Parts only Obtainable.

ROYAL

ROUND HOT WATER BOILERS

LISTS, DIMENSIONS AND CAPACITIES

Size No.	Net Rating in Square Ft. Direct Rad'n	List Prices		Height to Top Outlet Inches		Diameter in Inches—of			Depth of Fire Pot Inches	Outlets and Inlets 2 each Size in Ins.	Size of Coal
		High Base	Low Base	High Base	Low Base	Fire Pot	Smoke Pipe	Grate			
3-19-w	250	**302.00**	**268.00**	**48¾**	**41¾**	19	8	19	16¾	2-2½	Stove
4-19-w	365	**360.00**	**320.00**	52½	45½	19	8	19	16¾	2-2½	Stove
5-19-w	420	**395.00**	**356.00**	56¼	49½	19	8	19	16¾	2-2½	Stove
4-22-w	500	**425.00**	**382.00**	52¾	46	22	9	22	16¾	2-3	Stove
5-22-w	585	**465.00**	**425.00**	56¾	50	22	9	22	16¾	2-3	Stove
4-25-w	685	**505.00**	**462.00**	54¼	47½	25	9	25	17¼	2-3½	Stove
5-25-w	750	**545.00**	**498.00**	58¼	51½	25	9	25	17¼	2-3½	Stove
3-28-w	935	**651.00**	**590.00**	54½	47¼	28	10	28	18¾	2-4	Stv. or Egg
4-28-w	1000	**700.00**	**654.00**	58¾	51½	28	10	28	18¾	2-4	
5-28-w	1100	**746.00**	**706.00**	63	55¾	28	10	28	18¾	2-4	
4-31-w	1250	**842.00**	**775.00**	60½	53¼	31	10	31	19½	2-5	Egg
5-31-w	1350	**905.00**	**840.00**	65¾	58¾	31	10	31	19½	2-5	Egg
4-34-w	1500	**950.00**	**880.00**	66¾	58¾	34	12	34	19½	2-5	Egg
5-34-w	1765	**1017.00**	**945.00**	72	64	34	12	34	19½	2-5	Egg

These Boilers are of the Push Nipple Construction.

NOTE:—Royal Boilers will carry the ratings shown above and the mains in addition. Headers will be supplied when necessary.

This Boiler is replaced by "New King" pattern.

For Measurements, see Page 49.

ROYAL
ROUND HOT WATER BOILERS
NOW OBSOLETE
Repairs only obtainable

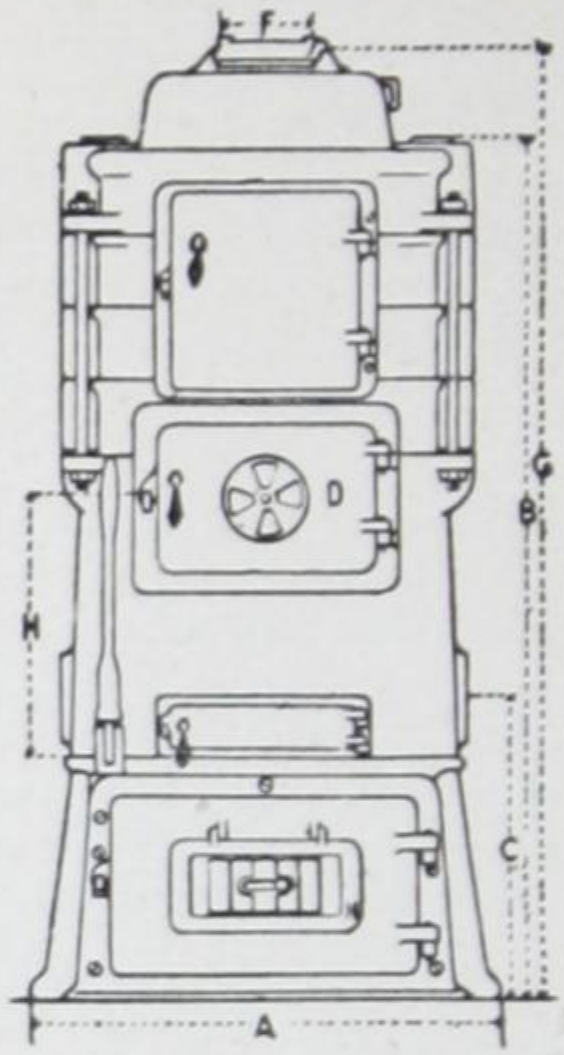


Table of Measurements as indicated on Sketch above.

Size	A	B	C	D	G	H
3-19-W	28	41½	15¾	8 x 12	48½	15
4-19-W	28	45½	15¾	8 x 12	52½	15
5-19-W	28	49½	15¾	8 x 12	56½	15
4-22-W	30	46	15¼	8 x 12	53	15
5-22-W	30	50	15¼	8 x 12	57	15
4-25-W	32	47½	15¾	8 x 12¼	55	15⅝
5-25-W	32	51½	15¾	8 x 12¼	59½	15⅝
3-28-W	34¾	47¼	17¼	9 x 14	55¾	16½
4-28-W	34¾	51½	17¼	9 x 14	60	16½
5-28-W	34¾	55¾	17¼	9 x 14	64¼	16½
4-31-W	37	53½	19½	9½ x 15½	62	17
5-31-W	37	58¾	19½	9½ x 15½	67	17
4-34-W	40	58¾	20	9½ x 15½	68	18
5-34-W	40	60	20	9½ x 15½	73½	18

NOTE:—The above measurements are for Low Base Boilers. To arrive at height of High Base Boilers add as follows:—

19 in. Boilers, 6¾ in.
25 in. Boilers, 6¾ in.
31 in. Boilers, 7 in.
22 in. Boilers, 6¾ in.
28 in. Boilers, 7¼ in.
34 in. Boilers, 8 in.

KING
HOT WATER BOILERS
TABLE OF MEASUREMENTS OF TWIN CONNECTIONS

No.	No. and Sizes of Outlets, in.	Valves		Diameter of Flanges in.	Length of Headers		Inside dia. Hdrs. in.	Centre to Centre of Flangeson Hdrs. in.	Centre to Centre of Flanges Flow and Return Headers.	Floor to Centre of End Opening				Floor to Top of Headers				Space Occupied		Distances between Boiler Bases, etc.	Size of Expansion Pipe in.
		No.	Size in.		Flow in.	Return in.				Flow		Return		Flow		Return		Width in.	Depth in.		
										H B	L B	H B	L B	H B	L B	H B	L B				
2	8–2	4	4	9	44	44	4	34	33¾	55 1/16	48⅜	22⅜	15¾	57 9/16	50 13/16	24⅞	18¼	58	50	6	1
2½	8–2	4	4	9	44	44	4	34	37¾	59 3/16	52 5/16	22⅜	15¾	61 11/16	54 13/16	24⅞	18¼	58	50	6	1
3	10–2	4	4	9	58¼	58¼	4	41	33¾	54¾	48	22⅜	15½	57¼	50½	24⅞	18	71	54	11	1
3½	10–2	4	4	9	58¼	58¼	4	41	37¾	58¾	52	22⅜	15½	61¼	54½	24⅞	18	71	54	11	1
4	10–2	4	4	9	58¼	58¼	4	41	33¾	55⅝	48¾	22⅜	15¾	58⅛	51¼	24⅞	18¼	73½	56½	8½	1
4½	10–2	4	4	9	58¼	58¼	4	41	37¾	59½	52⅞	22⅜	15¾	62	55⅜	24⅞	18¼	73½	56½	8½	1
5	12–2	4	5	10	72¼	72¼	5	45½	37	62⅞	54¾	24⅝	17⅜	65⅞	57¾	27⅝	20⅜	80	60	10¾	1
5½	12–2	4	5	10	72¼	72¼	5	45½	41¾	66	58¾	24⅝	17⅜	69	61¾	27⅝	20⅜	80	60	10¾	1
6	12–2	4	5	10	72¼	72¼	5	45½	37½	61¾	55¼	24	17½	64¾	58¼	27	20½	82½	63	8½	1¼
6A	12–2	4	5	10	72¼	72¼	5	45½	42¼	65¾	59¼	24	17½	68¾	62¼	27	20½	82½	63	8½	1¼
6½	14–2	4	6	11	86¼	86¼	6	54	39½	65⅞	59¾	26⅛	20⅛	69⅜	63¼	29⅝	23⅝	98	67	10	1¼
6½A	14–2	4	6	11	86¼	86¼	6	54	44½	70½	64⅝	26⅛	20⅛	74	68⅛	29⅝	23⅝	98	67	10	1¼
7	16–2	4	6	11	100½	100½	6	57	40½	65⅞	59⅞	26	20⅛	69⅜	63⅜	29½	23⅝	100	74	12	1¼
7½	16–2	4	6	11	100½	100½	6	57	45½	70¾	64⅝	26	20⅛	74¼	68⅛	29½	23⅝	100	74	12	1¼
8	20–2	4	7	12½	128¼	128¼	7	65	42½	68¾	62⅞	27⅛	21⅛	72¾	66⅞	31⅛	25⅛	128½	83	19	1¼
8½	20–2	4	7	12½	128¼	128¼	7	65	47¾	74¼	68	27⅛	21⅛	78¼	72	31⅛	25⅛	128½	83	19	1¼
9	20–2	4	7	12½	128¼	128¼	7	88	42½	69	62⅞	27¼	21⅛	73	66⅞	31¼	25⅛	166¾	87	38	1½
9½	20–2	4	7	12½	128¼	128¼	7	88	47¾	74⅜	68	27¼	21⅛	78⅜	72	31¼	25⅛	166¾	87	38	2

NOTE:—Space occupied. Width means Distance between outside of Bases. Depth means distance from front of ashpit to back of Return Header.

Standard Centres are as follows:—2 in. Outlets, 7 in. Centres 2½ in. Outlets, 8½ in. Centres
3 in. Outlets, 10½ in. Centres 3½ in. Outlets, 12 in. Centres 4 in. Outlets, 13 in. Centres
4½ in. Outlets, 14 in. Centres 5 in. Outlets, 15 in. Centres 6 in. Outlets, 18 in. Centres

Twin, Triple and Quadruple Headers must rest upon supports provided for that purpose.

NOTE:—For Prices and Capacities, see Boiler Section, Pages 45-46. **All sizes excepting No. 9 now Obsolete in this type of Boiler.**

NEW KING, KING AND ROYAL
ROUND WATER AND STEAM BOILERS
ARRANGEMENT OF GRATES AND CONNECTING BARS

Size of Boiler	No. of Grates in Set	Left Hand Shake	Right Hand Shake	Connecting Bar	
				Left Hand	Right Hand
1–2	3	3		1	
3	3	3		1	
4	4	4		1	
5	4	2 Back grates	2 Front grates	1 Long	1 Short
6	4	2 Front grates	2 Back grates	1 Short	1 Long
6½	5	3 Front grates	2 Back grates	1 Short	1 Long
7	5	3 Front grates	2 Back grates	1 Short	1 Long
8	6	3 Front grates	3 Back grates	1 Short	1 Long
9	6	3 Front grates	3 Back grates	1 Long	1 Short

NOTE:—Half size Boilers take same grate as next size smaller. Example No. 3½ takes same as No. 3.

No. 4C. take same as No. 4. All A. Boilers are half size.

When ordering grates for repairs:—

Indicate the grate required for Round Boilers by numbering from front to back.

ROYAL SQUARE STEAM AND WATER BOILERS
ARRANGEMENT OF GRATES AND CONNECTING BARS

Size of Boiler	No. of Grates	Left Hand Shake	Right Hand Shake	Connecting Bar		Connecting Rod	
				Left Hand	Right Hand	Left Hand	Right Hand
S. or W.							
15–4	3	3		1–3 Link		1 Short	
15–5	4	4		1–4 Link		1 Short	
15–6	5	5		1–5 Link		1 Short	
19–5	4	4		1–4 Link		1 Short	
19–6	5	5		1–5 Link		1 Short	
19–7	6	6		1–6 Link		1 Short	
25–5	4	2	2	1–2 Link	1–2 Link	1 Short	1 Long
25–6	5	3	2	1–3 Link	1–2 Link	1 Short	1 Long
25–7	6	3	3	1–3 Link	1–3 Link	1 Short	1 Long
25–8	7	4	3	1–4 Link	1–3 Link	1 Short	1 Long
36–5	4	2	2	1–2 Link	1–2 Link	1 Short	1 Long
36–6	5	3	2	1–3 Link	1–2 Link	1 Short	1 Long
36–7	6	3	3	1–3 Link	1–3 Link	1 Short	1 Long
36–8	7	4	3	1–4 Link	1–3 Link	1 Short	1 Long
36–9	8	4	4	1–4 Link	1–4 Link	1 Short	1 Long

In square Boilers the grates are all alike for each series.

RADIATOR SECTION

IMPERIAL RADIATORS

ONE COLUMN—WATER OR STEAM

MALLEABLE SCREW NIPPLE CONNECTIONS

IMPERIAL PATTERN

Plain

DIMENSIONS

Width of Section	4⅜ Inches
Width of Legs	4⅜ Inches
Distances floor to centre of openings	4½ Inches

Made only in Single Connections.

NOTE—For Tapping Schedule and Roughing-in Measurements, see pages 73-78.

IMPERIAL RADIATORS

MALLEABLE SCREW NIPPLE CONNECTIONS

ONE COLUMN — WATER OR STEAM

LISTS, CAPACITIES AND DIMENSIONS

Number of Section	Length of Radiator Including Plugs and Bushings	HEATING SURFACE IN SQUARE FEET				
		38 ins. high 3 sqr. ft. per section	32 ins. high 2½ sqr. ft. per section	26 ins. high 2 sqr. ft. per section	23 ins. high 1⅔ sqr. ft. per section	20 ins high 1½ sqr. ft. per section
2	6	6	5	4	3⅓	3
3	8½	9	7½	6	5	4½
4	11	12	10	8	6⅔	6
5	13½	15	12½	10	8⅓	7½
6	16	18	15	12	10	9
7	18½	21	17½	14	11⅔	10½
8	21	24	20	16	13⅓	12
9	23½	27	22½	18	15	13½
10	26	30	25	20	16⅔	15
11	28½	33	27½	22	18½	16½
12	31	36	30	24	20	18
13	33½	39	32½	26	21⅔	19½
14	36	42	35	28	23⅓	21
15	38½	45	37½	30	25	22½
16	41	48	40	32	26⅔	24
17	43½	51	42½	34	28⅓	25½
18	46	54	45	36	30	27
19	48½	57	47½	38	31⅔	28½
20	51	60	50	40	33⅓	30
21	53½	63	52½	42	35	31½
22	56	66	55	44	36⅔	33
23	58½	69	57½	46	38⅓	34
24	61	72	60	48	40	36
25	63½	75	62½	50	41⅔	37½
Price per Square Foot		**$1.00**	**$1.10**	**$1.20**	**$1.26**	**$1.36**

To find equivalent in 1 inch pipe, multiply square foot surface by 3.

TAPPINGS, SINGLE CONNECTION ONLY

Length of Radiator is estimated on the basis of 2½ in. for each section plus ½ in. on each end for plugs and bushings.

NOTE:—Schedule of Tappings and Roughing-in Measurements, Pages 73-78.

IMPERIAL RADIATORS

TWO COLUMN—WATER OR STEAM

MALLEABLE SCREW NIPPLE CONNECTIONS

IMPERIAL PATTERN
Plain

Width of Section	7 ¼ Inches
Width of Legs	7 ¼ Inches
Distance from Floor to Centre of Openings	4 ½ Inches
Distance between Centres of Twin Connections	3 ¼ Inches

Made in Single and Twin Connections

NOTE—For all other dimensions see pages 73-78.

IMPERIAL RADIATORS

MALLEABLE SCREW-NIPPLE CONNECTIONS

TWO COLUMN — WATER OR STEAM

LISTS, CAPACITIES AND DIMENSIONS

Number of sections	Length of Radiator Including Plugs and Bushings	HEATING SURFACE IN SQUARE FEET						
		45 in. high 5 sq. ft. per section	38 in. high 4 sq. ft. per section	32 in. high 3⅓ sq. ft. per section	30 in. high 3 sq. ft. per section	26 in. high 2⅔ sq. ft. per section	23 in. high 2⅓ sq. ft. per section	20 in. high 2 sq. ft. per section
2	6	10	8	6⅔	6	5⅓	4⅔	4
3	8½	15	12	10	9	8	7	6
4	11	20	16	13⅓	12	10⅔	9⅓	8
5	13½	25	20	16⅔	15	13⅓	11⅔	10
6	16	30	24	20	18	16	14	12
7	18½	35	28	23⅓	21	18⅔	16⅓	14
8	21	40	32	26⅔	24	21⅓	18⅔	16
9	23½	45	36	30	27	24	21	18
10	26	50	40	33⅓	30	26⅔	23⅓	20
11	28½	55	44	36⅔	33	29⅓	25⅔	22
12	31	60	48	40	36	32	28	24
13	33½	65	52	43⅓	39	34⅔	30⅓	26
14	36	70	56	46⅔	42	37⅓	32⅔	28
15	38½	75	60	50	45	40	35	30
16	41	80	64	53⅓	48	42⅔	37⅓	32
17	43½	85	68	56⅔	51	45⅓	39⅔	34
18	46	90	72	60	54	48	42	36
19	48½	95	76	63⅓	57	50⅔	44⅓	38
20	51	100	80	66⅔	60	53⅓	46⅔	40
21	53½	105	84	70	63	56	49	42
22	56	110	88	73⅓	66	58⅔	51⅓	44
23	58½	115	92	76⅔	69	61⅓	53⅔	46
24	61	120	96	80	72	64	56	48
25	63½	125	100	83⅓	75	66⅔	58⅓	50
Price per Sq. Foot		**$1.00**	**$1.00**	**$1.10**	**$1.15**	**$1.20**	**$1.26**	**$1.36**

To find equivalent in 1 inch pipe, multiply square foot surface by 3.

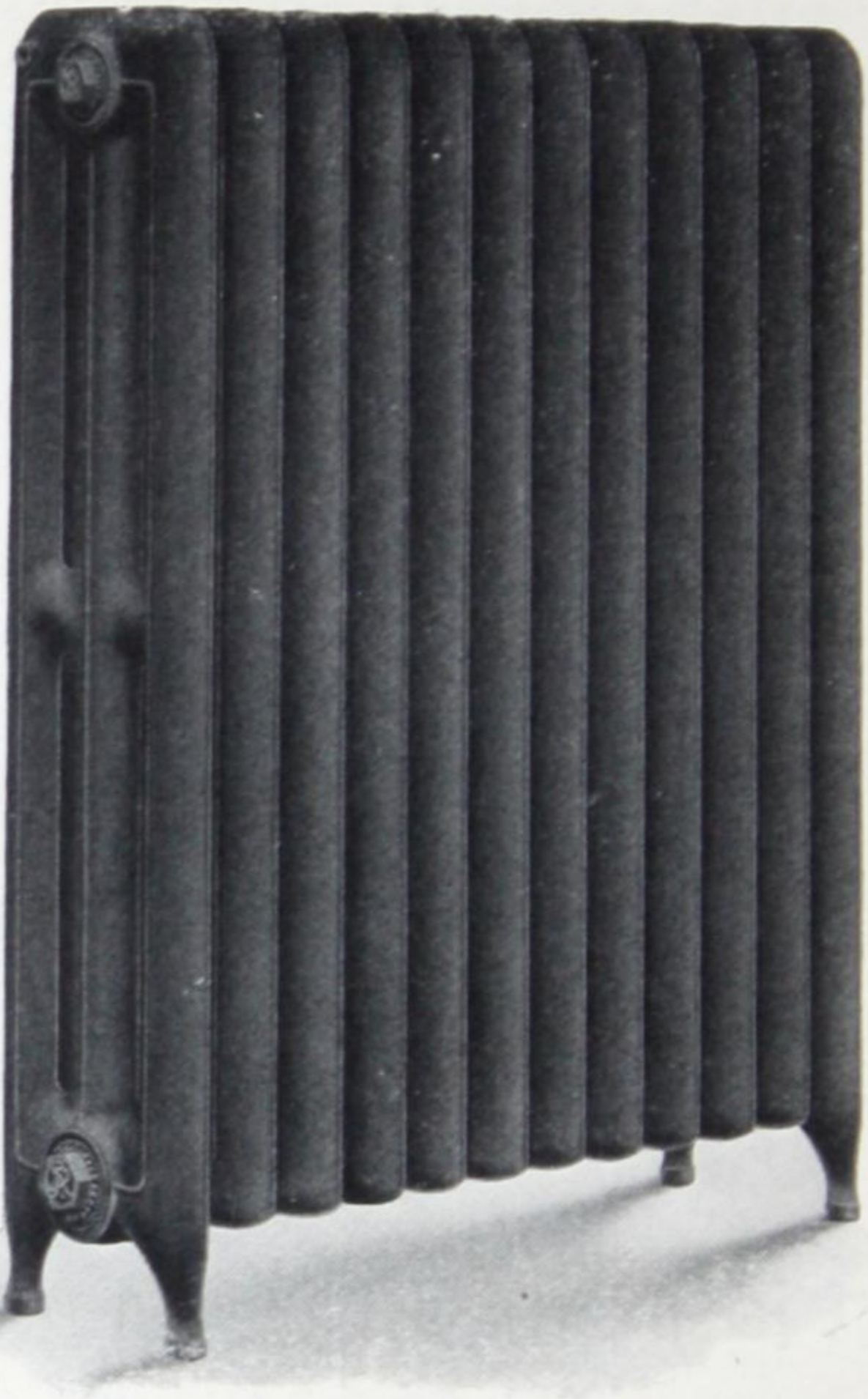
Length of Radiator is estimated on the basis of 2½ in. for every section plus ½ in. on each end for plugs and bushings.

NOTE:—Schedule of Tappings and Roughing-in Measurements, see pages 73-78.

IMPERIAL RADIATORS

THREE COLUMN—WATER OR STEAM

MALLEABLE SCREW NIPPLE CONNECTIONS



IMPERIAL PATTERN
Plain

Width of Section	9 Inches
Width of Legs	9 Inches
Distance from floor to centre of opening	4½ Inches
Distance between centres of twin connections	3¼ Inches

Made in single or twin connections.

NOTE—For all other Dimensions see pages 73-78.

IMPERIAL RADIATORS

MALLEABLE SCREW NIPPLE CONNECTIONS

THREE COLUMN — WATER OR STEAM

LISTS, CAPACITIES AND DIMENSIONS

Number of sections	Length of Radiator incl'd'g Plugs and Bushing	HEATING SURFACE IN SQUARE FEET.					
		44 in. high 6 sq. ft. per section.	38 in. high 5 sq. ft. per section.	32 in. high 4½ sq. ft. per section.	26 in. high 3¾ sq. ft. per section.	22 in. high 3 sq. ft. per section.	18 in. high 2¼ sq. ft. per section
2	6	12	10	9	7½	6	4½
3	8½	18	15	13½	11¼	9	6¾
4	11	24	20	18	15	12	9
5	13½	30	25	22½	18¾	15	11¼
6	16	36	30	27	22½	18	13½
7	18½	42	35	31½	26¼	21	15¾
8	21	48	40	36	30	24	18
9	23½	54	45	40½	33¾	27	20¼
10	26	60	50	45	37½	30	22½
11	28½	66	55	49½	41¼	33	24¾
12	31	72	60	54	45	36	27
13	33½	78	65	58½	48¾	39	29¼
14	36	84	70	63	52½	42	31½
15	38½	90	75	67½	56¼	45	33¾
16	41	96	80	72	60	48	36
17	43½	102	85	76½	63¾	51	38¼
18	46	108	90	81	67½	54	40½
19	48½	114	95	85½	71¼	57	42¾
20	51	120	100	90	75	60	45
21	53½	126	105	94½	78¾	63	47¼
22	56	132	110	99	82½	66	49½
23	58½	138	115	103½	86¼	69	51¾
24	61	144	120	108	90	72	54
25	63½	150	125	112½	93¾	75	56¼
Price per Sq. Foot		**$1.00**	**$1.00**	**$1.10**	**$1.20**	**$1.30**	**$1.40**

To find equivalent in 1 inch pipe, multiply square foot surface by 3.

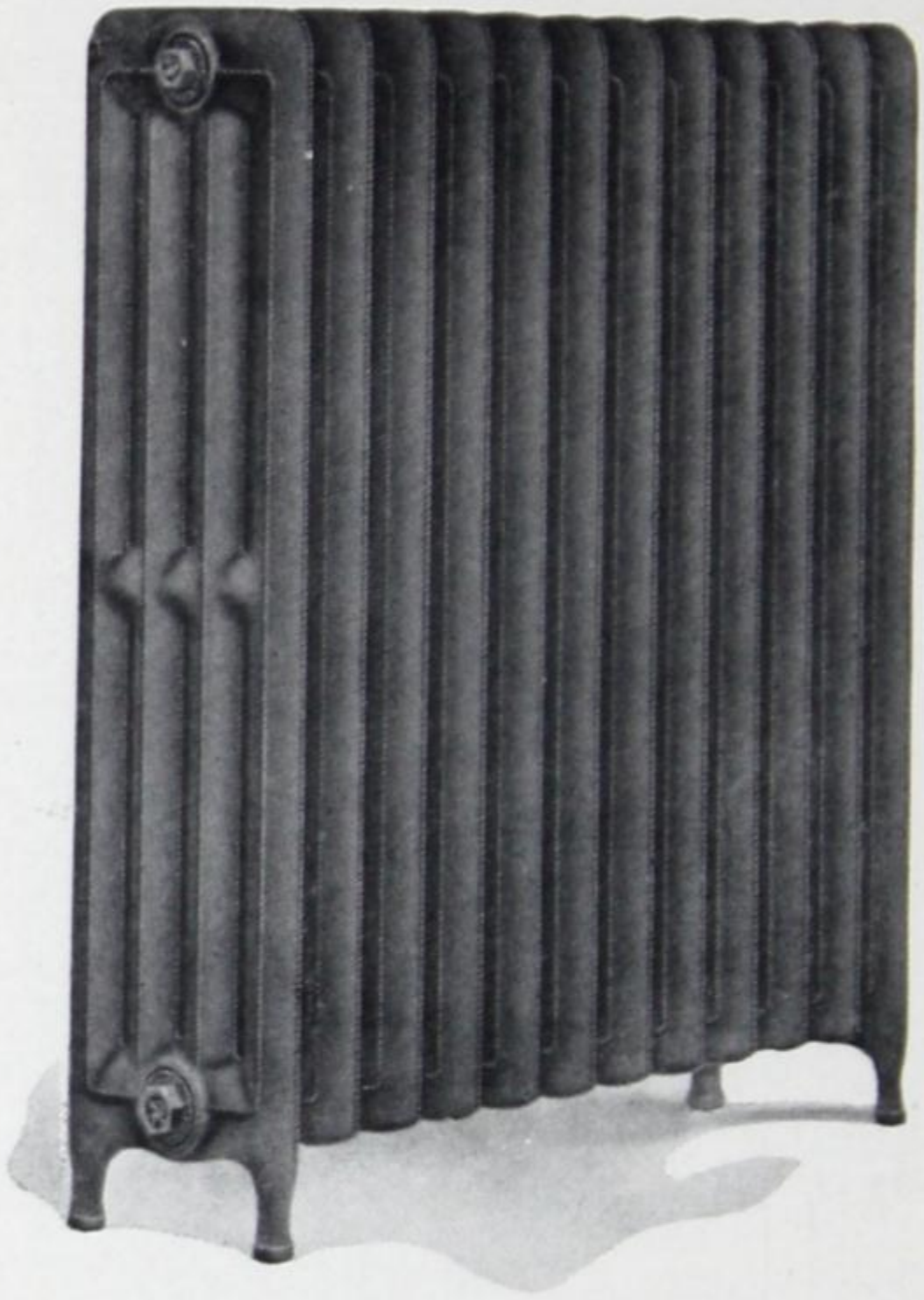
Length of Radiator is estimated on the basis of 2½ in. for each section plus ½ in. on each end for plugs and bushings.

NOTE:—Schedule of Tappings and Roughing-in Measurements, pages 73-78.

IMPERIAL RADIATORS

FOUR COLUMN—WATER OR STEAM

MALLEABLE SCREW NIPPLE CONNECTIONS



IMPERIAL PATTERN
Plain

Width of Section	11½ Inches
Width of Legs	11½ Inches
Distance from floor to centre of openings	4½ Inches
Distance between centres of twin connections	3¼ Inches

Made in single or twin connections.

NOTE—For all other Dimensions see pages 73-78.

IMPERIAL RADIATORS

MALLEABLE SCREW NIPPLE CONNECTIONS

FOUR COLUMN — WATER OR STEAM

PLAIN ONLY

DIMENSIONS AND CAPACITIES

Number of Sections	Length of Radiator Including plugs and Bushing	HEATING SURFACE IN SQUARE FEET					
		45″ high 10 sq. feet per Section	38″ high 8 sq. feet per Section	32″ high 6½ sq. feet per Section	26″ high 5 sq. feet per Section	22″ high 4 sq. feet per Section	18″ high 3 sq. feet per Section
2	7	20	16	13	10	8	6
3	10	30	24	19½	15	12	9
4	13	40	32	26	20	16	12
5	16	50	40	32½	25	20	15
6	19	60	48	39	30	24	18
7	22	70	56	45½	35	28	21
8	25	80	64	52	40	32	24
9	28	90	72	58½	45	36	27
10	31	100	80	65	50	40	30
11	34	110	88	71½	55	44	33
12	37	120	96	78	60	48	36
13	40	130	104	84½	65	52	39
14	43	140	112	91	70	56	42
15	46	150	120	97½	75	60	45
16	49	160	128	104	80	64	48
17	52	170	136	110½	85	68	51
18	55	180	144	117	90	72	54
19	58	190	152	123½	95	76	57
20	61	200	160	130	100	80	60
21	64	210	168	136½	105	84	63
22	67	220	176	143	110	88	66
23	70	230	184	149½	115	92	69
24	73	240	192	156	120	96	72
25	76	250	200	162½	125	100	75
Price per Square Foot		**$1.00**	**$1.00**	**$1.10**	**$1.20**	**$1.30**	**$1.40**

To find equivalent in inch pipe, multiply square foot surface by 3.

Length of Radiator is estimated on the basis of 3 inches for each section plus ½ inch on each end for plugs and bushings.

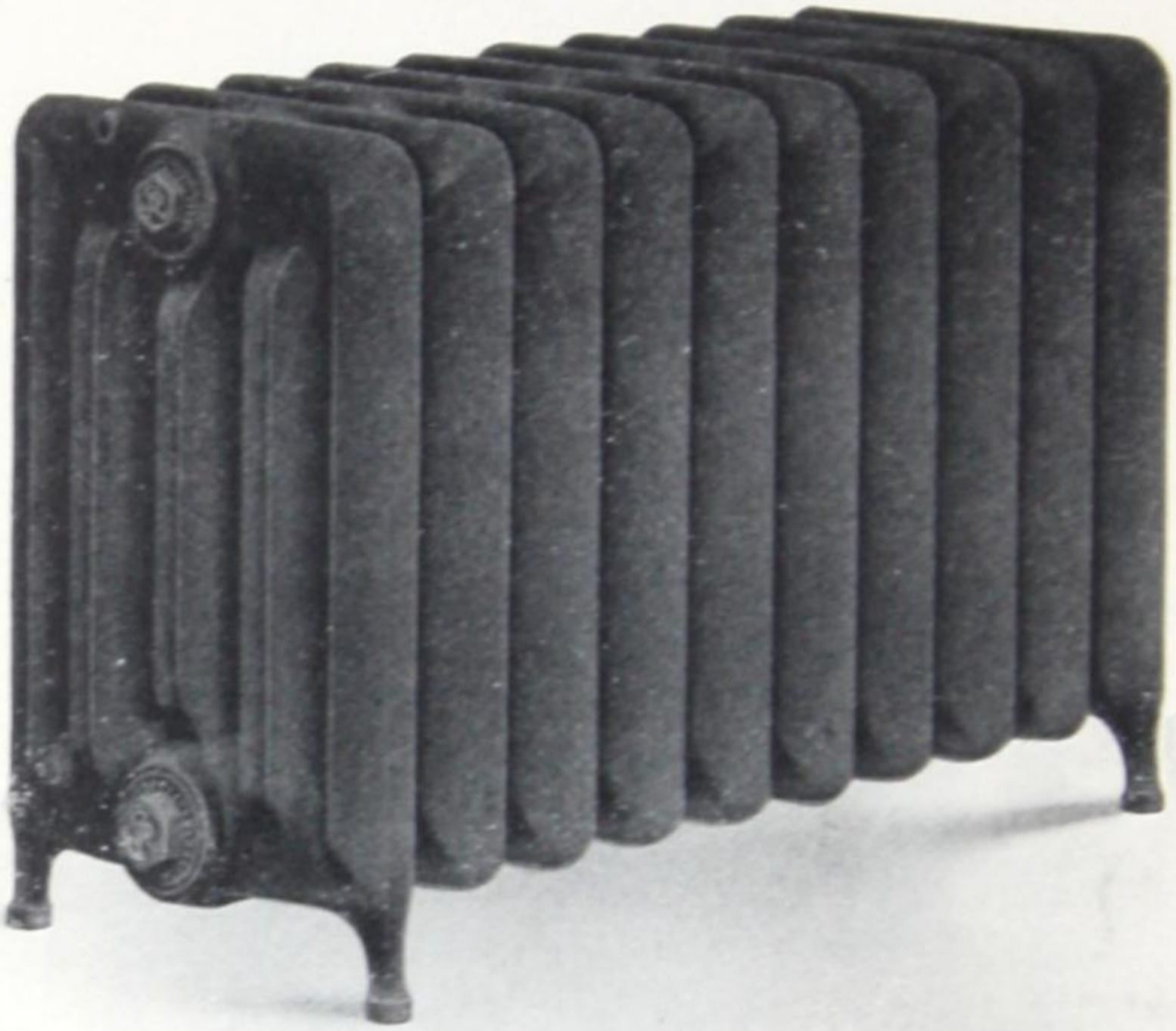
Schedule Tappings and Roughing-in Measurements, see pages 73-78.

IMPERIAL RADIATORS

WINDOW PATTERN

FIVE COLUMN—WATER OR STEAM

MALLEABLE SCREW NIPPLE CONNECTIONS



IMPERIAL PATTERN

Plain Only

Width of Section	13	Inches
Width of Legs	13	Inches
Distance from floor to centre of openings 16 in. and 20 in	3½	Inches
Distance from floor to centre of openings 14 in. and 18 in	1½	Inches
Distance between centres of twin connections	3¼	Inches

Made in Single or Twin connections.

To make 14 in. and 18 in., 2 in. is cut off legs of 16 in. and 20 in.

NOTE—For all other dimensions see pages 73-78.

IMPERIAL RADIATORS

MALLEABLE SCREW NIPPLE CONNECTIONS

FIVE COLUMN

WINDOW RADIATOR — WATER OR STEAM

LISTS, CAPACITIES AND DIMENSIONS

Number of Sections	Length of Radiators Including Plugs and Bushings	HEATING SURFACE IN SQUARE FEET			
		20 in. high 6 sq. ft. per section	18 in. high 6 sq. ft. per section	16 in high 4⅔ sq. ft. per section	14 in. high 4⅔ sq. ft. per section
2	7	12	12	9⅓	9⅓
3	10	18	18	14	14
4	13	24	24	18⅔	18⅔
5	16	30	30	23⅓	23⅓
6	19	36	36	28	28
7	22	42	42	32⅔	32⅔
8	25	48	48	37⅓	37⅓
9	28	54	54	42	42
10	31	60	60	46⅔	46⅔
11	34	66	66	51⅓	51⅓
12	37	72	72	56	56
13	40	78	78	60⅔	60⅔
14	43	84	84	65⅓	65⅓
15	46	90	90	70	70
16	49	96	96	74⅔	74⅔
17	52	102	102	79⅓	79⅓
18	55	108	108	84	84
19	58	114	114	88⅔	88⅔
20	61	120	120	93⅓	93⅓
21	64	126	126	98	98
22	67	132	132	102⅔	102⅔
23	70	138	138	107⅓	107⅓
24	73	144	144	112	112
25	76	150	150	116⅔	116⅔
Price per Square foot		**$1.36**	**$1.40**	**$1.50**	**$1.55**

To find equivalent in 1 inch pipe, multiply square foot surface by 3.

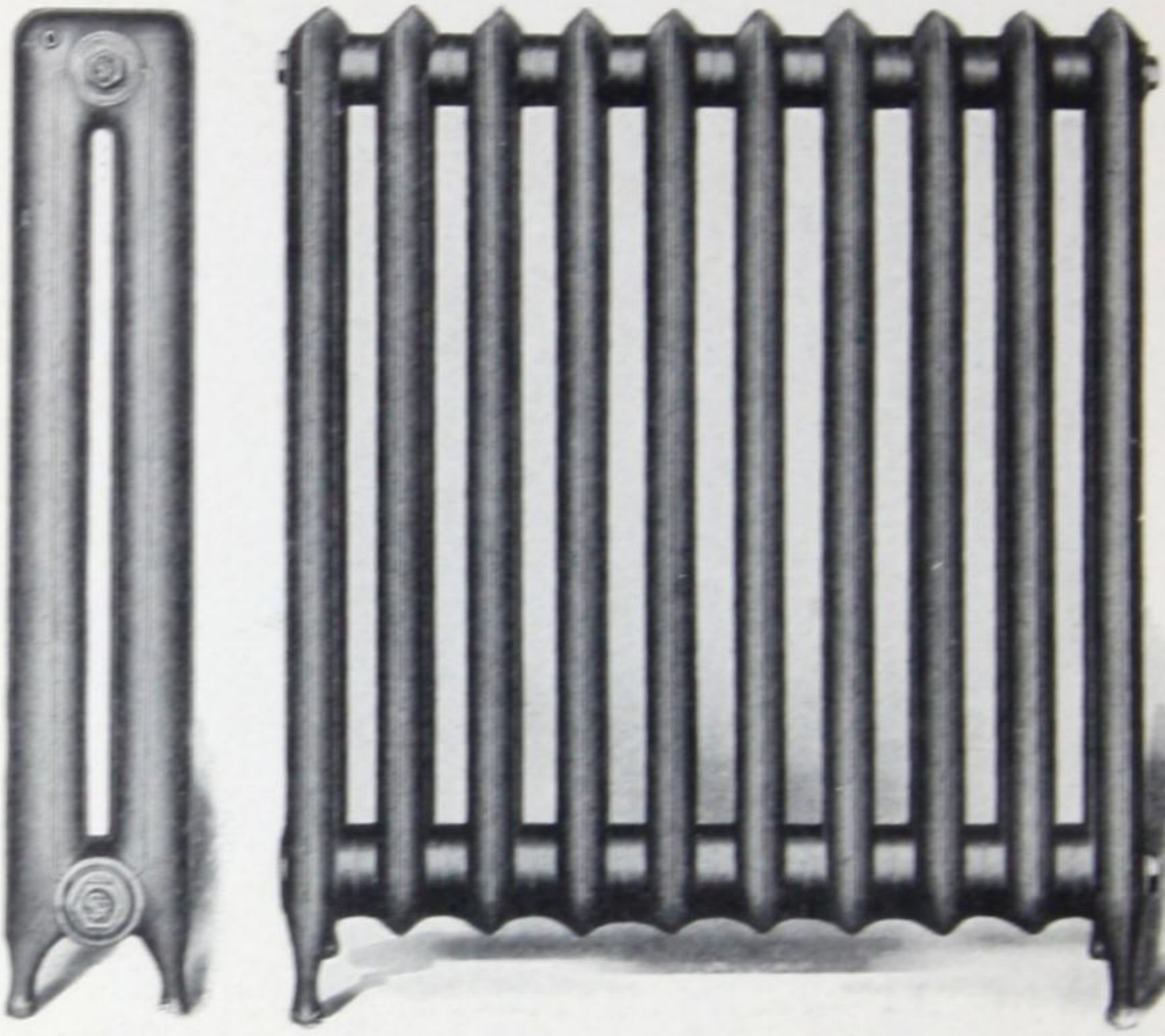
Length of Radiator is estimated on the basis of 3 in. for each section plus ½ in. on each end for plugs and bushings.

NOTE:—Schedule of Tappings and Roughing-in Measurements, Pages 73-78.

To make 14 in. and 18 in., 2 in. is cut off legs of 16 in. and 20 in.

IMPERIAL RADIATORS

IMPERIAL HOSPITAL PATTERN
TWO COLUMN—PLAIN ONLY
MALLEABLE SCREW NIPPLE CONNECTIONS



HOT WATER TYPE
Dimensions

Width of Section, Two Column	7¼ Inches
Width of Legs, Two Column	7¼ Inches
Distance from floor to centre of opening (Standard)	4½ Inches
(Legs can be made any height required)	
Distance between centres of twin connections	3¼ Inches

Made in Single and Twin Connections.

For other Dimensions see pages 73-78.

IMPERIAL RADIATORS

MALLEABLE SCREW NIPPLE CONNECTIONS

IMPERIAL HOSPITAL PATTERN

TWO COLUMN WATER OR STEAM

LISTS, CAPACITIES AND DIMENSIONS

Number of Sections	Length of Radiator Including Plugs and Bushings	HEATING SURFACE IN SQUARE FEET						
		45 in. high 5 sq. ft. per section	38 in. high 4 sq. ft. per section	32 in. high 3⅓ sq. ft. per section	30 in. high 3 sq. ft. per section	26 in. high 2⅔ sq. ft. per section	23 in. high 2⅓ sq. ft. per section	20 in. high 2 sq. ft. per section
2	7	10	8	6⅔	6	5⅓	4⅔	4
3	10½	15	12	10	9	8	7	6
4	14	20	16	13⅓	12	10⅔	9⅓	8
5	17½	25	20	16⅔	15	13⅓	11⅔	10
6	21	30	24	20	18	16	14	12
7	24½	35	28	23⅓	21	18⅔	16⅓	14
8	28	40	32	26⅔	24	21⅓	18⅔	16
9	31½	45	36	30	27	24	21	18
10	35	50	40	33⅓	30	26⅔	23⅓	20
11	38½	55	44	36⅔	33	29⅓	25⅔	22
12	42	60	48	40	36	32	28	24
13	45½	65	52	43⅓	39	34⅔	30⅓	26
14	49	70	56	46⅔	42	37⅓	32⅔	28
15	53½	75	60	50	45	40	35	30
16	56	80	64	53⅓	48	42⅔	37⅓	32
17	59½	85	68	56⅔	51	45⅓	39⅔	34
18	63	90	72	60	54	48	42	36
19	66½	95	76	63⅓	57	50⅔	44⅓	38
20	70	100	80	66⅔	60	53⅓	46⅔	40
21	73½	105	84	70	63	56	49	42
22	77	110	88	73⅓	66	58⅔	51⅓	44
23	80½	115	92	76⅔	69	61⅓	53⅔	46
24	84	120	96	80	72	64	56	48
25	87½	125	100	83⅓	75	66⅔	58⅓	50
Price per Sq. Foot		**$1.00**	**$1.00**	**$1.10**	**$1.15**	**$1.20**	**$1.26**	**$1.36**

To find equivalent in 1 inch pipe, multiply square foot surface by 3.

Length of Radiator is estimated on the basis of 3½ in. for every section, (except Leg Sections), plus ½ in. on each end for plugs and bushings.

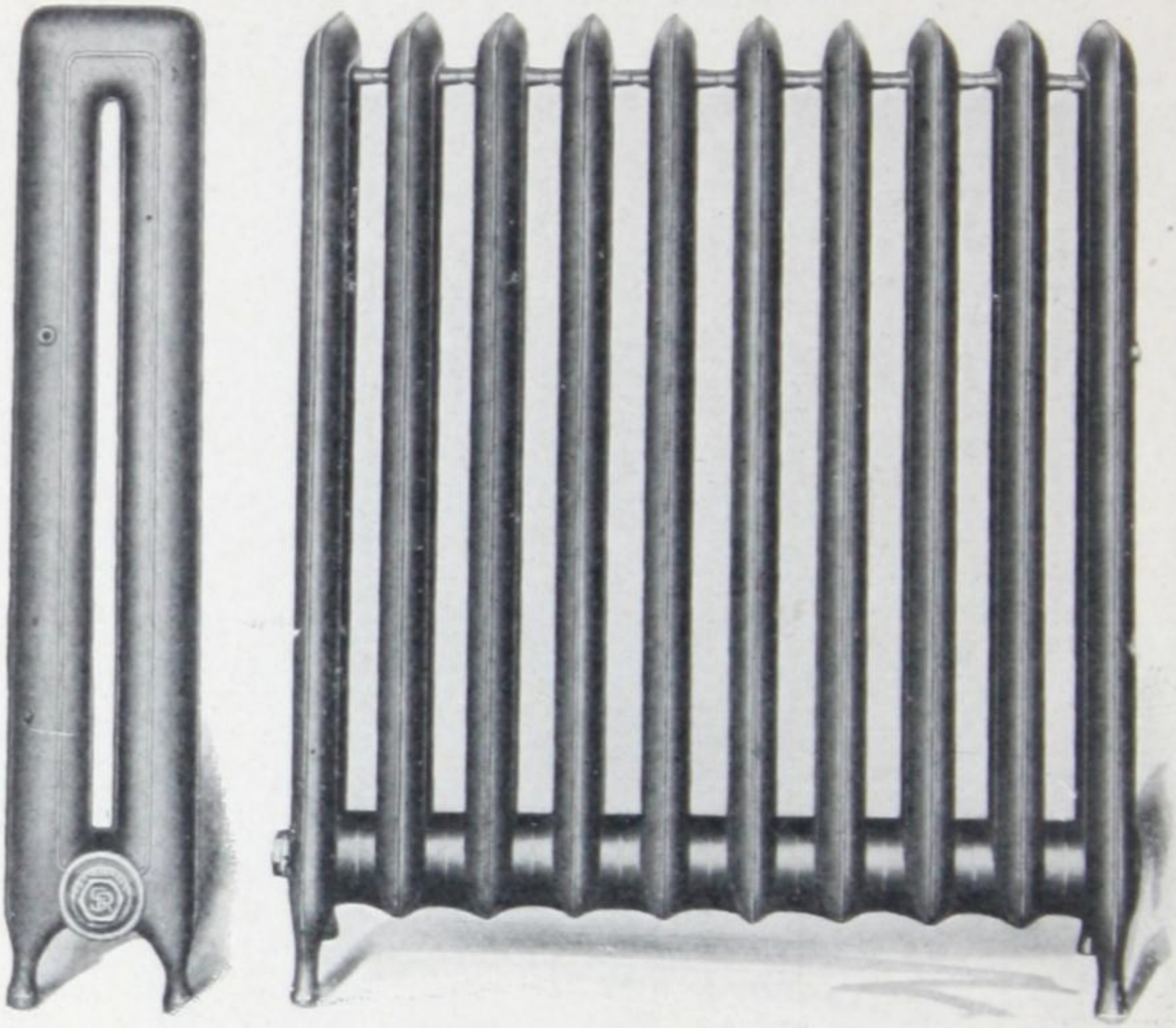
NOTE:—Schedule of Tappings and Roughing-in Measurements, Pages 73-78.

IMPERIAL RADIATORS

IMPERIAL HOSPITAL RADIATOR

TWO COLUMN—PLAIN ONLY

MALLEABLE SCREW NIPPLE CONNECTIONS



STEAM TYPE

Dimensions

Width of Section, Two Column ..... 7¼ Inches
Width of Legs, Two Column ..... 7¼ Inches
Distance from floor to centre of openings (Standard) ..... 4½ Inches

(Legs can be made any height required)

Distance between centres of Twin Connections ..... 3¼ Inches

Made in Single and Twin Connections

For other Dimensions see page 73-78.

IMPERIAL RADIATORS

MALLEABLE SCREW NIPPLE CONNECTIONS

IMPERIAL HOSPITAL PATTERN

THREE COLUMN — WATER OR STEAM

LISTS, CAPACITIES AND DIMENSIONS

Height	Heating Surface in Square Feet					
	44 in. high	38 in. high	32 in. high	26 in. high	20 in. high	18 in. high
	6 sq. ft. per section.	5 sq. ft. per section.	4½ sq. ft. per section.	3½ sq. ft. per section.	3 sq. ft. per section.	2¼ sq. ft. per section.
2	7	12	10	9	7½	6	4½
3	10½	18	15	13½	11¼	9	6¾
4	14	24	20	18	15	12	9
5	17½	30	25	22½	18¾	15	11¼
6	21	36	30	27	22½	18	13½
7	24½	42	35	31½	26¼	21	15¾
8	28	48	40	36	30	24	18
9	31½	54	45	40½	33¾	27	20¼
10	35	60	50	45	37½	30	22½
11	38½	66	55	49½	41¼	33	24¾
12	42	72	60	54	45	36	27
13	45½	78	65	58½	48¾	39	29¼
14	49	84	70	63	52½	42	31½
15	52½	90	75	67½	56¼	45	33¾
16	56	96	80	72	60	48	36
17	59½	102	85	76½	63¾	51	38¼
18	63	108	90	81	67½	54	40½
19	66½	114	95	85½	71¼	57	42¾
20	70	120	100	90	75	60	45
21	73½	126	105	94½	78¾	63	47¼
22	77	132	110	99	82½	66	49½
23	80½	138	115	103½	86¼	69	51¾
24	84	144	120	108	90	72	54
25	87½	150	125	112½	93¾	75	56¼
Price per Sq. Foot	$1.00	$1.00	$1.10	$1.20	$1.30	$1.40

To find equivalent in 1 inch pipe, multiply square foot surface by 3.

Length of Radiator is estimated on the basis of 3½ in. for each section, (except Leg Sections), plus ½ in. on each end for plugs and bushings.

NOTE:—Schedule of Tappings see Roughing-in Measurements, Pages 73-78.

IMPERIAL

WALL RADIATORS

MALLEABLE SCREW NIPPLE CONNECTIONS

9 FT. VERTICAL SECTION

NOTE—For Diagrams and Measurements see pages 73-78.

IMPERIAL
WALL RADIATORS

WATER AND STEAM—PLAIN
MALLEABLE SCREW NIPPLE CONNECTIONS
VERTICAL

PRICES, DIMENSIONS AND CAPACITIES

Section	Height (Inches)	Length (Inches)	Thickness (Inches)	Heating Surface (Sq. Feet)	List Price
7 ft.	21 7/8	13 5/16	3 1/16	7	1.05
9 ft.	29 1/16	13 5/16	3 1/16	9	1.05
12 ft.	15 5/16	29 1/16	3 1/2	12	1.05

To find equivalent in 1 inch pipe, multiply square foot surface by 3.

Radiators may be made up of any number of sections and in any desired variety of vertical arrangement.

Orders should be accompanied by sketch showing tappings desired.

NOTE—For Diagrams and Measurements, see Pages 73-78. Schedule Tappings, Pages 73-78.

KING WALL RADIATORS

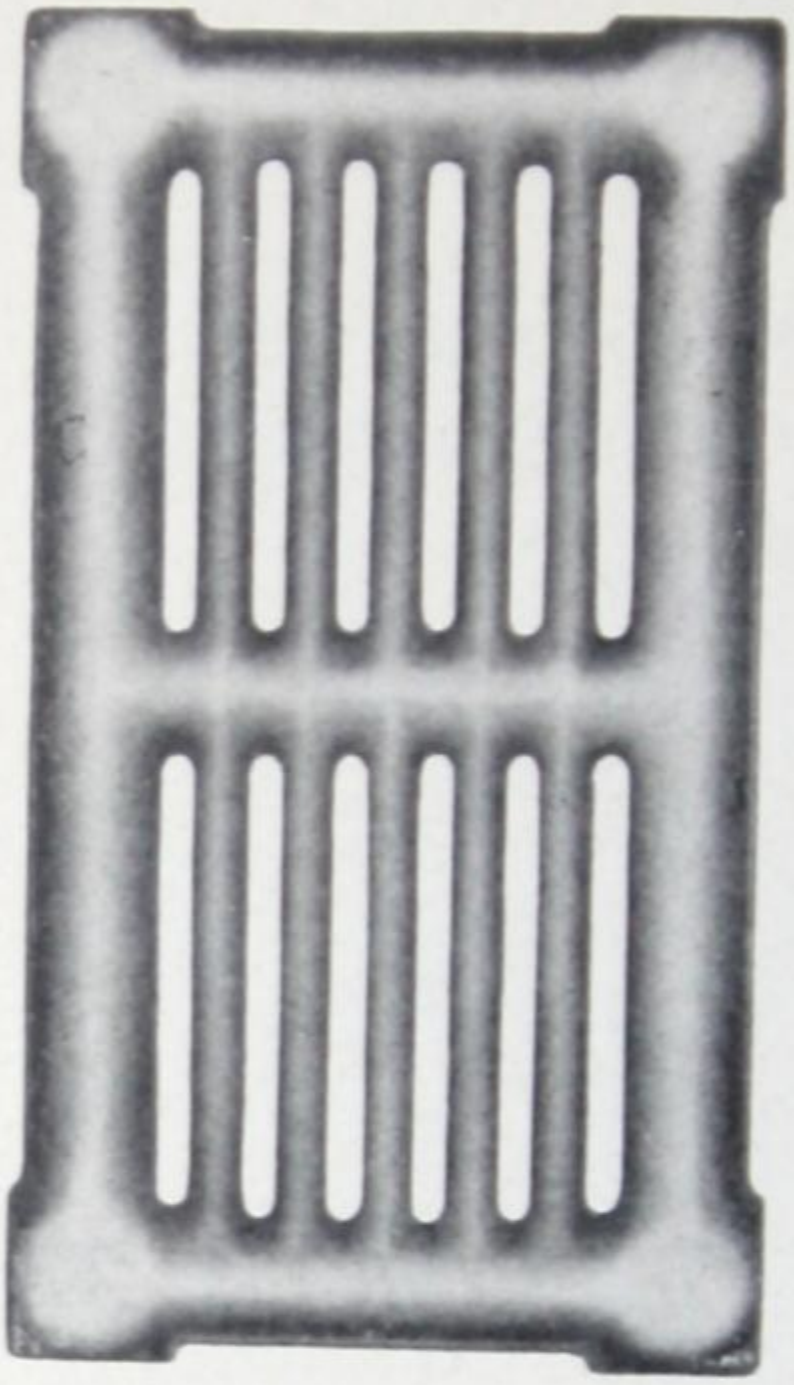
MALLEABLE SCREW NIPPLE CONNECTIONS

VERTICAL AND HORIZONTAL

WATER OR STEAM

Plain Only

Lists, Capacities and Dimensions



Square Feet Per Section	Width Inches	Length Inches	Thick-ness of Hub Inches	Price List
9	13	24	3¼	$1.05
7	13	24	3	1.05
6	13	21	3	1.10
5	13	17	3	1.15

To find equivalent in 1 inch pipe, multiply square foot surface by 3.

Radiators may be made up of any number of sections and in any desired variety of vertical or horizontal arrangement.

9 ft.—Vertical Section, Plain.

Orders must be accompanied by sketch showing tappings desired.

Floor wall brackets, to suit base boards and wall line, made in various styles.

CLUSTER WALL RADIATORS

For Clustering Wall Radiators, we make an extra charge, as follows—

Sections Thick	1 and 2 Sections Long	3 and 4 Sections Long	5 and 6 Sections Long	7 and 8 Sections Long
2	$4.00	$4.50	$5.00	$5.50
3	6.00	6.50	7.00	7.50
4	8.00	8.50	9.00	9.50
5	10.00	10.50	11.00	11.50
6	12.00	12.50	13.00	13.50

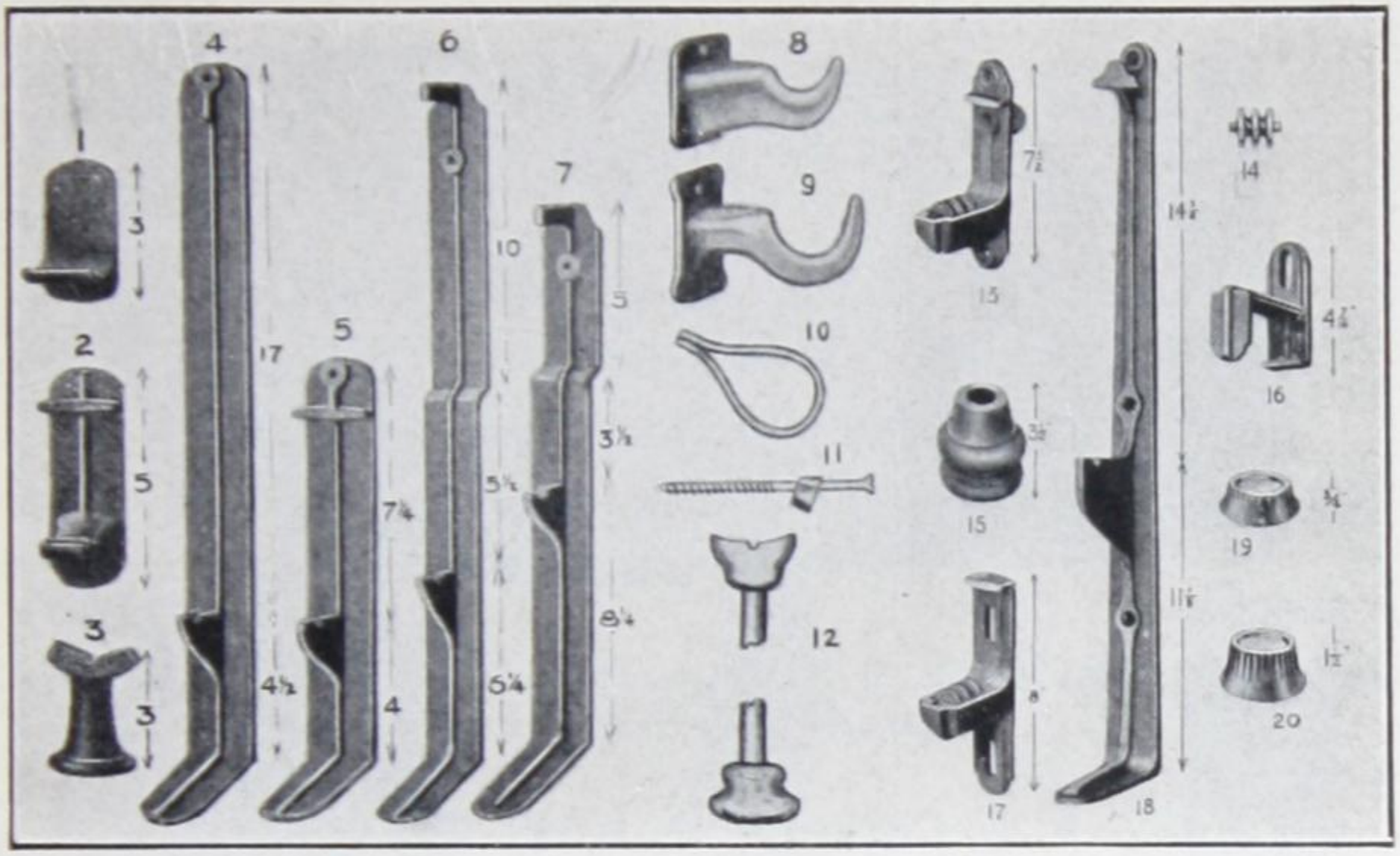
Add for each additional thickness an extra charge of $2.00 to above list prices.

Orders should be accompanied by sketch showing tappings desired.

NOTE—Schedule of Tappings, Diagrams and Measurements, see Pages 73-78.

IMPERIAL and KING

WALL RADIATOR BRACKETS
ILLUSTRATIONS



PRICE LIST

No.	1	2	3	4	5	6	7	8	9	10
List Price	.08	.10	.20	.50	.40	.50	.45	.50	.50	.60

No.	11	12	13	14	15	16	17	18	19	20
List Price	.20	.40								

NOTE—Nos. 8 and 9 are concealed Brackets used instead of the ordinary leg for supporting OUR one, two, three and four column Radiators.

No. 12 can be adjusted to any height desired.

Wall Radiator Buttons only 10c. each.

MEASUREMENTS

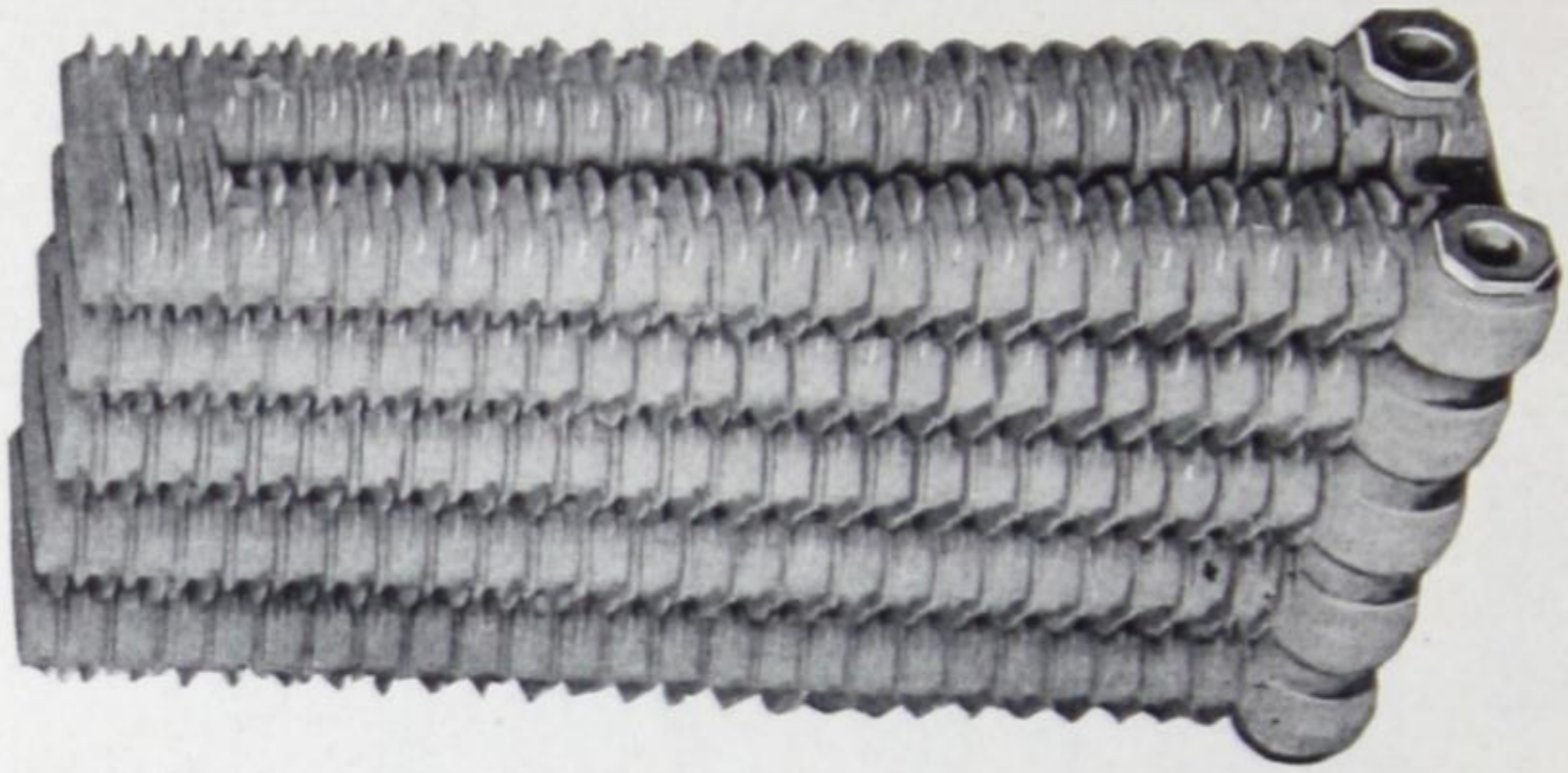
Distance from Wall to Centre of Single Connection Tappings.

BRACKET NOS.	1	2	8	9
Imperial Wall 9 ft	2 1/4"	2 1/4"		
King Wall 7 ft	2"	2"		
King Wall 9 ft	2 7/16"	2 7/16"		
Imperial One Column			2 3/16"	2 3/16"
Imperial Two Column			4 3/8"	4 3/8"
Imperial Three Column			5 1/4"	5 1/4"
King Four Column			5 1/8"	5 1/8"

IMPERIAL RADIATORS

CLIMAX INDIRECT—WATER OR STEAM

Malleable Screw Nipple Connections



Length, 36 inches; height, 11 inches; width, 4 inches. Each section contains 13 square feet of heating surface.

DATA FOR CLIMAX INDIRECT RADIATORS

Sections in Stack.	Sq. feet of Heating Surface.	Area Cold Air Supply. Sq. inches.	Area Hot Air Flue. Sq. inches.	Size for Brick Work Hot Air Flues. Inches.	Size Register. Inches.
2	26	54	72	8 x 8	9 x 12
3	39	72	96	8 x 12	10 x 14
4	52	90	120	8 x 12	12 x 15
5	65	108	144	12 x 12	12 x 19
6	78	126	168	12 x 12	14 x 22
7	91	144	192	12 x 16	14 x 24
8	104	162	226	12 x 16	16 x 20
9	117	180	240	12 x 20	16 x 24
10	130	198	264	12 x 20	20 x 20
11	143	216	288	12 x 24	20 x 24
12	156	234	312	12 x 24	20 x 24

LIST PRICE, CLIMAX INDIRECT (Loose or built) $1.00 per sq. ft.

NOTE—Shipped in single sections unless otherwise ordered.

VENTO CAST IRON HOT BLAST HEATERS

LIST, CAPACITY AND DIMENSIONS

Description	Sq. ft. per Section	List price per sq. ft.	Height	Width	Shipping Weights per sq. ft.
Regular 30 in. Section.....	8.00	$1.15	30	9 1/8	9 1/4
Regular 40 in. Section.....	10.75	.90	41 1/64	9 1/8	9
Regular 50 in. Section.....	13.5	.90	50 29/32	9 1/8	9
Regular 60 in. Section.....	16.0	.90	60 11/16	9 1/8	9
Regular 72 in. Section.....	19.0	1.15	72 3/32	9 1/8	9
Narrow 40 in. Section.....	7.5	1.15	41 1/64	6 3/4	9 1/4
Narrow 50 in. Section.....	9.5	1.15	50 29/32	6 3/4	9 1/4
Narrow 60 in. Section.....	11.0	1.15	60 11/16	6 3/4	9 1/4

Extra 2½" Hexagon Nipple	Each	$ 1.00
Vento Nipple Wrench 2½"	Each	16.00
2½" L.H. Vento Plugs	Each	.45
2" and 2½" Bushings	Each	.50

Centre of Loops, 5"—5⅜" and 4⅝"

NOTE—Add 2½" for staggering of stacks.

Regular Tapping, 40", 50", 60".
Feed 2½" R.H. Return 2½" L.H.

Regular Tappings 30"
Feed 2" R.H., Return 2" L.H.

Regular Tappings 72"
Feed 3" R.H., Return 3" L..H.
Bushed to any size Required.
Air Vent Tapping, ⅜"

Stack of Ten
Regular Sections

Sectional
72 View

Narrow
Section

IMPERIAL RADIATORS

STANDARD TAPPINGS

ONE PIPE, STEAM

25 square feet and under.....1 inch
Over 25, not to exceed 60 square feet.....1¼ inch
Over 60, not to exceed 100 square feet.....1½ inch
Over 100 square feet.....2 inch

All one pipe connections, unless otherwise ordered, are eccentric and tapped left hand.

TWO PIPE, STEAM

48 square feet and under.....1 inch x ¾ inch
Over 48, but not to exceed 95 square feet.....1¼ inch x 1 inch
Over 95 square feet.....1½ inch x 1¼ inch

All two pipe connections, unless otherwise ordered, are tapped right hand. Return opening is tapped eccentric.

WATER, SINGLE OR TWIN CONNECTIONS

48 square feet and under.....1 inch x 1 inch
Over 48 square feet.....1¼ inch x 1¼ inch
Over 100 square feet (if ordered).....1½ inch x 1½ inch

All Hot water Radiators are shipped twin connections, tapped left hand unless otherwise ordered. Single or top and bottom connections are tapped right hand.

Wall Radiators are tapped top and bottom same end, left hand for hot water unless otherwise ordered.

NOTE.—When using union valves or union elbows please state this fact in ordering, so that connections may be tapped right hand.

In ordering, give number of sections in each Radiator, height of same, size of tapping, whether right or left hand, and state if for water or steam, and if plain or ornamental.

NOTE—For Prices and Capacities, see Radiator Section, pages 53-72.

TAPPINGS

THERMOSTATIC TRAP STEAM HEATING SYSTEMS HOT WATER TYPE RADIATION—TOP—INLET

VAPOR SYSTEM—8 OZ. PRESSURE

Sq. Ft. Radiation	Supply			Return		
	Inlet Valve Inches	Vertical Pipe to Inlet valve Inches	Horizontal Run out To Riser Inches	Trap No.	Stub to Trap Inches	Horizontal Runout to Return riser Inches
1-25	½	½	¾	1	½	¾
26-80	¾	¾	1	1	½	¾
81-100	¾	¾	1 ¼	1	½	¾
101-140	1	1	1 ¼	2	½	¾
141-180	1	1	1 ¼	2	½	¾

RETURN SYSTEMS AND VACUUM SYSTEMS RADIATOR CONNECTIONS

Hot Water Type Radiation—Top Inlet

Sq. Ft. Radiation	Supply			Return		
	Inlet Valve Inches	Vertical Pipe to Inlet valve Inches	Horizontal Run out To Riser Inches	Trap No.	Stub to Trap Inches	Horizontal Runout to Riser Inches
1-25	½	½	¾	1	½	¾
26-100	¾	¾	1	1	½	¾
101-180	1	1	1 ¼	2	½	¾
181-300	1 ¼	1 ¼	1 ½	2	½	¾

RADIATOR CONNECTIONS

Steam Type Radiation—Bottom Inlet

Sq. Ft. Radiation	Supply			Return		
	Inlet Valve Inches	Vertical Pipe to Inlet valve Inches	Horizontal Run out to Riser Inches	Trap No.	Stub to Trap Inches	Horizontal Runout to Riser Inches
1-25	½	½	¾	1	½	¾
26-80	¾	¾	1	1	½	¾
81-150	1	1	1 ¼	2	½	¾
151-300	1 ¼	1 ¼	1 ½	2	½	¾
301-450	1 ½	1 ½	2	3*	¾	¾

No. 1—Radiator Trap up to 100 square feet.

*No. 2 Radiator Trap up to 350 square feet.

NOTE—Returns for all above systems must be eccentric. Air vent Tapping for all above Systems must be Plugged.

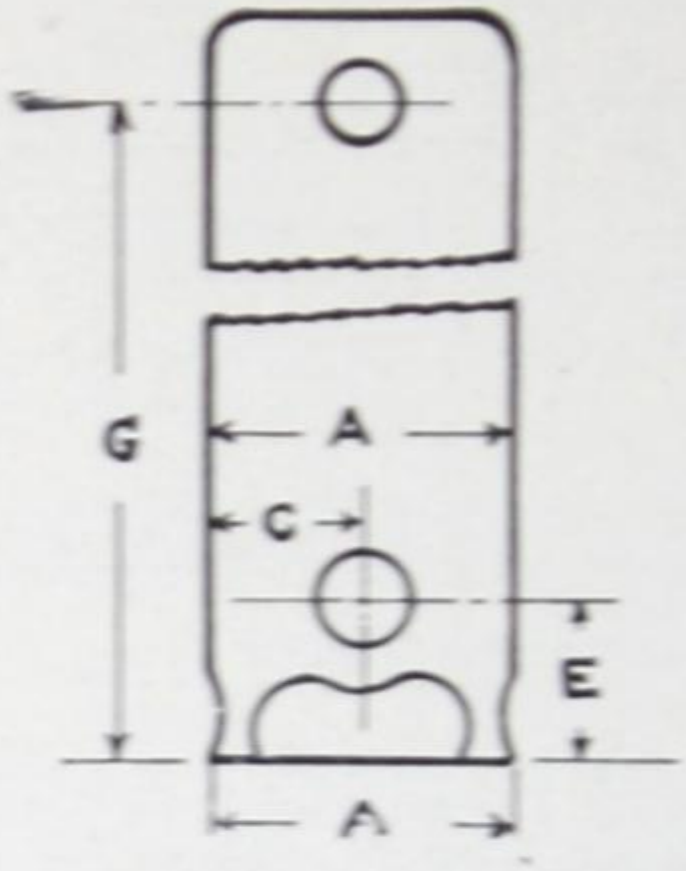
TAPPINGS FOR HONEYWELL SYSTEM FOR SINGLE AND TWIN CONNECTION

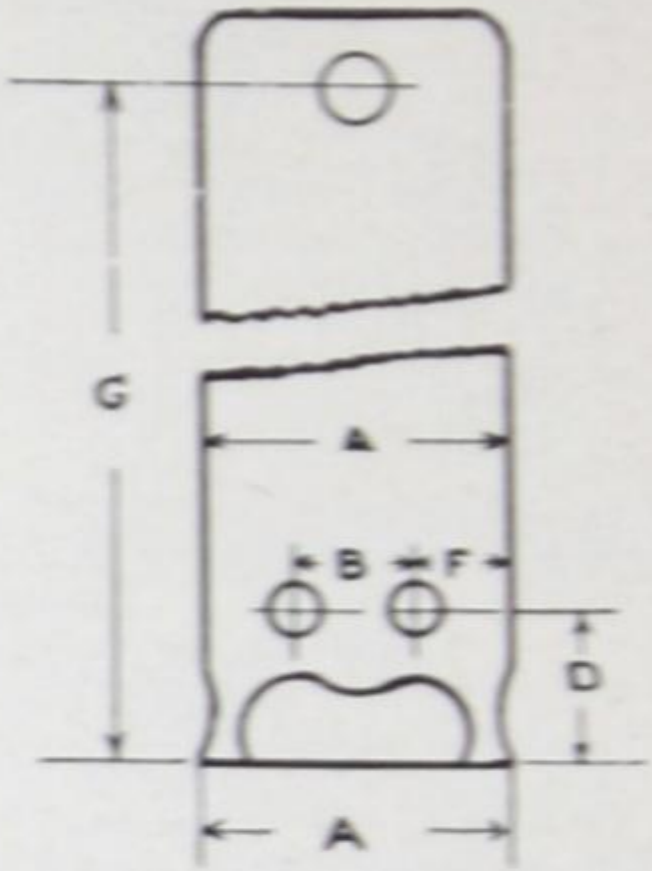
Ground Floor	1st Floor	2nd, 3rd, 4th, 5th, Floors	Tappings
Up to 30 feet	Up to 40 feet	Up to 50 feet	½ inch
30 to 60 feet	40 to 100 feet	50 to 125 feet	¾ inch
60 to 100 feet	Over 100 feet	Over 125 feet	1 inch
Over 100 feet	.....	.....	1¼ inch

Use one size larger tappings for Radiators on the extreme ends of long mains. Special tappings when Honeywell unique valves are used.

IMPERIAL AND KING RADIATORS

DIMENSIONS OF LOOPS AND CENTRES OF TAPPINGS





Tappings for Water, also supply end of Steam Radiators

Particulars		A	B	C	D	E	F
1 Column Imperial	inches	4 1/16		2 1/4		4 1/2	
2 Column Imperial	inches	7 1/4	3 1/4	3 5/8	4 1/2	4 1/2	2
3 Column Imperial	inches	9 1/4	3 1/4	4 5/8	4 1/2	4 1/2	3
4 Column Imperial	inches	11 1/2	3 1/4	5 1/4	4 1/2	4 1/2	4 1/16
5 Column Imperial	16 and 20 inches	13	3 1/4	6 1/2	3 1/2	3 1/2	4 7/16
5 Column Imperial	14 and 18 inches	13	3 1/4	6 1/2	2	2	4 7/16
2 Column King	inches	7	3 1/4	3 1/2	4	4	1 7/16
3 Column King	inches	9	3 1/4	4 1/2	4 1/2	4 1/2	2 7/16
4 Column King	inches	8 1/4	3 1/4	4 5/8	4	4	2 3/4

NOTE—Width of legs and sections are the same.

ECCENTRIC TAPPINGS—STEAM

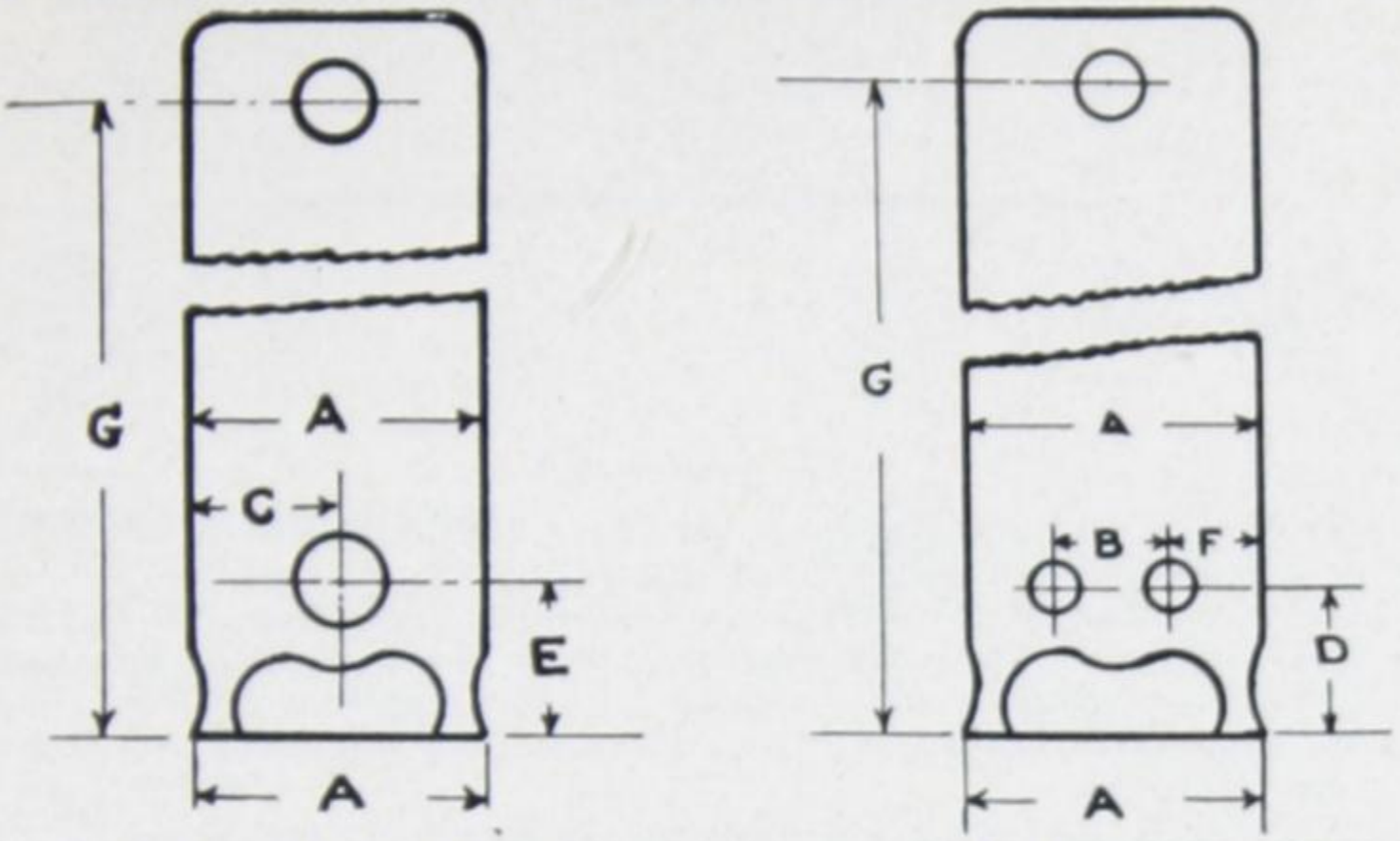
Distance from floor to centre of bottom opening

Size Tapping		1 1/2"	1 1/4"	1"	3/4"	1/2"
1 Column Imperial	inches	4 1/4	4 1/8	4	3 7/8	3 3/4
2 Column Imperial	inches	4 1/4	4 1/8	4	3 7/8	3 3/4
3 Column Imperial	inches	4 1/4	4 1/8	4	3 7/8	3 3/4
4 Column Imperial	inches	4 1/4	4 1/8	4	3 7/8	3 3/4
5 Column Imperial	16 and 20 inches	3 1/4	3 1/8	3	2 7/8	2 3/4
5 Column Imperial	14 and 18 inches	1 7/8	1 3/4	1 5/8	1 1/2	1 3/8
2 Column King	inches	3 3/4	3 5/8	3 1/2	3 3/8	3 1/4
3 Column King	inches	4 1/4	4 1/8	4	3 7/8	3 3/4
4 Column King	inches	3 3/4	3 5/8	3 1/2	3 3/8	3 1/4

NOTE—For Prices and Capacities see Radiator Sections, Pages 53-72.

IMPERIAL AND KING RADIATORS

DIMENSIONS OF LOOPS AND CENTRES OF TAPPINGS



G:—DISTANCE FROM FLOOR TO CENTRE OF TOP OPENING

Height-Radiator	45	44	42	38	32	30	26	23	22	20	18	16	14
1 Col. Imperial...				35 3/4	29 3/4		23 3/4	20 3/4		17 3/4			
2 Col. Imperial...	41 3/4			35 3/4	29 3/4	27 1/2	24	20 7/8		18 1/4			
3 Col. Imperial...		41 3/4		35 3/4	29 3/4		23 3/4		19 3/4		15 3/4		
4 Col. Imperial...	42 1/2			35 1/2	29 1/2		23 1/2		19 1/2		15 1/2		
5 Col. Imperial...										18	16 1/2	14 1/8	12 5/8
2 Col. King.....	42 1/2			35 3/8	29 1/2		23 3/8	20 5/8		17 5/8			
3 Col. King.....		41 1/2		35 1/2	29 1/2		23 1/2		19 1/2		15 3/4		
4 Col. King.....			39 5/8	36	30		24			18		14	

NOTE—Bushings are used as follows—Hot water single connections both ends.
Top and bottom connection both ends.
Steam two pipe one end.

IMPERIAL AND KING
WALL RADIATORS

ACTUAL DIMENSIONS AND ROUGHING-IN MEASUREMENTS

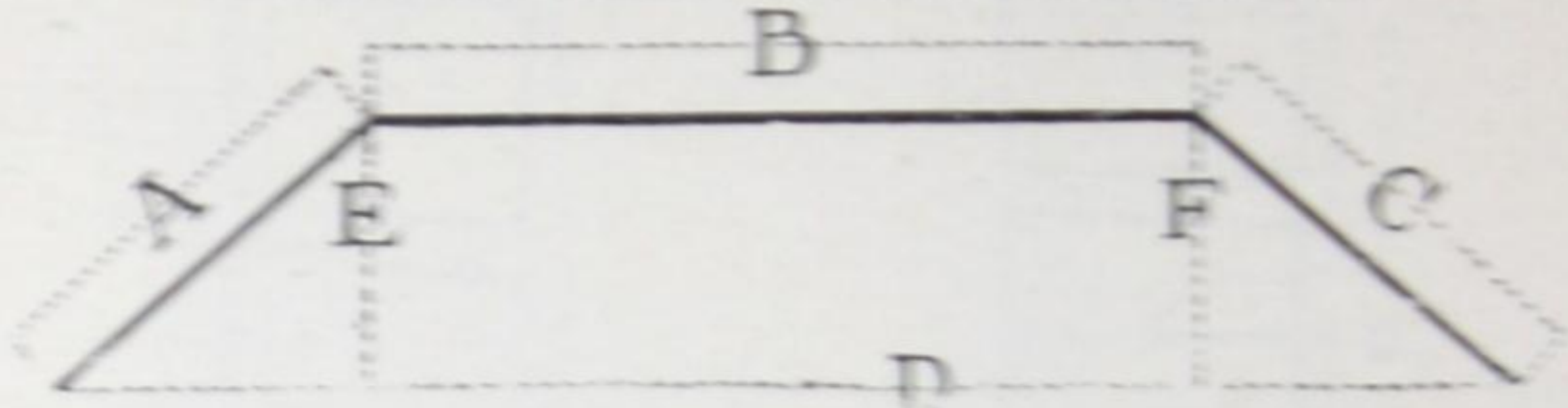
Sq. ft. Per Section	Description	Length or Height Inches	Width Inches	Thickness of Hub Inches	Centre to Centre of Tappings Inches	
					End of Section	Side of Section
9	Imperial	28 3/4	13 5/16	3 1/16		25 5/8
9	King	23 9/16	13	3 1/4	10 5/16	20 5/8
7	King	23 9/16	13	3	10 5/16	20 5/8
7	Imperial	21 7/8	13 5/16	3 1/16		18 7/16
6	King	20 9/16	13	3	10 1/4	17 11/16
5	King	17	13	3	10 3/16	14 3/16

NOTE—For Prices and Capacities, see Radiator Section, pages 53-72.

IMPERIAL AND KING RADIATORS

BAY WINDOW—SPECIALS—CIRCULAR

MALLEABLE SCREW NIPPLE CONNECTIONS



In ordering this style of Radiator an exact templet should be furnished, but where this is not convenient the above diagram will be required.

Care must be taken to give exact measurements indicated by letters A, B, C, D, E, F. If twin connections are required, state if on right or left hand side as you stand facing the window or inner side of Radiator.

Made in one, two, three and four column and Wall styles, in any height and size to suit window.

NOTE—Corner Radiators are always made single connection.

APPROXIMATE SPACE OCCUPIED BY ANGLE AND CORNER SECTIONS

Style	2 Column		3 Column		4 Column King		5 Column		Wall
IMPERIAL AND KING	Angle	Corner	Angle	Corner	Angle	Corner	Angle	Corner	Angle
Distance each way from centre of Angle loop to face of Standard loop.	4 in.	9 in.	4½ in.	10 in.	5 in.	10 in.	6½ in.		1½ in.

DIMENSIONS FOR CIRCULAR RADIATORS

Made in one, two, three or four column, any height, of the following dimensions—

TWO COLUMN			THREE COLUMN			FOUR COLUMN		
No. of Sections	Outside Diam.	Inside Diam.	No. of Sections	Outside Diam.	Inside Diam.	No. of Sections	Outside Diam.	Inside Diam.
16	23½	7½	12	26¾	6¾	12	24	7
18	25½	9½	14	27	7½	14	28	11
20	27	11	16	28¼	8¾	16	29½	12½
24	29	13	18	29¼	9¾	18	33½	16½
28	33	17	20	30¼	10¾	20	34	17
32	36½	20½	22	31¼	11¾	22	36	19
38	40½	24½	24	32¼	12¾	28	40	23
40	40½	24½	26	32¾	13¼	32	52½	35½

All full circle Radiators are made in halves, with supply and return on side or bottom of sections of each half. State style of connection required.

NOTE—For measurements, see page 75-76. For prices and capacities, see Radiator Section, pages 58-72.

IMPERIAL AND KING
WALL RADIATORS

Diagrams showing usual forms of assembling. These may be increased any number of sections to secure the desired heating capacity.

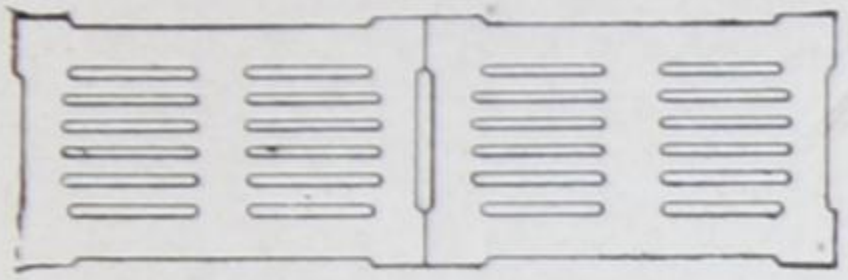


Diagram 1.—Horizontal

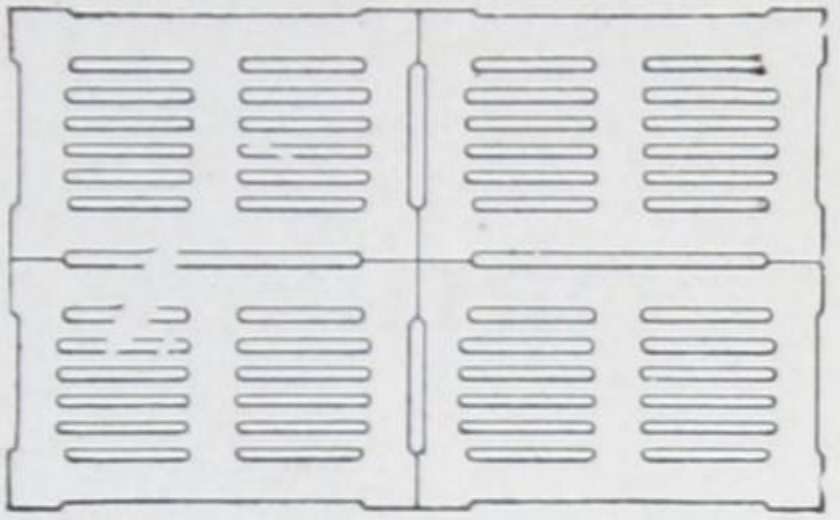


Diagram 2.—Horizontal Tiered

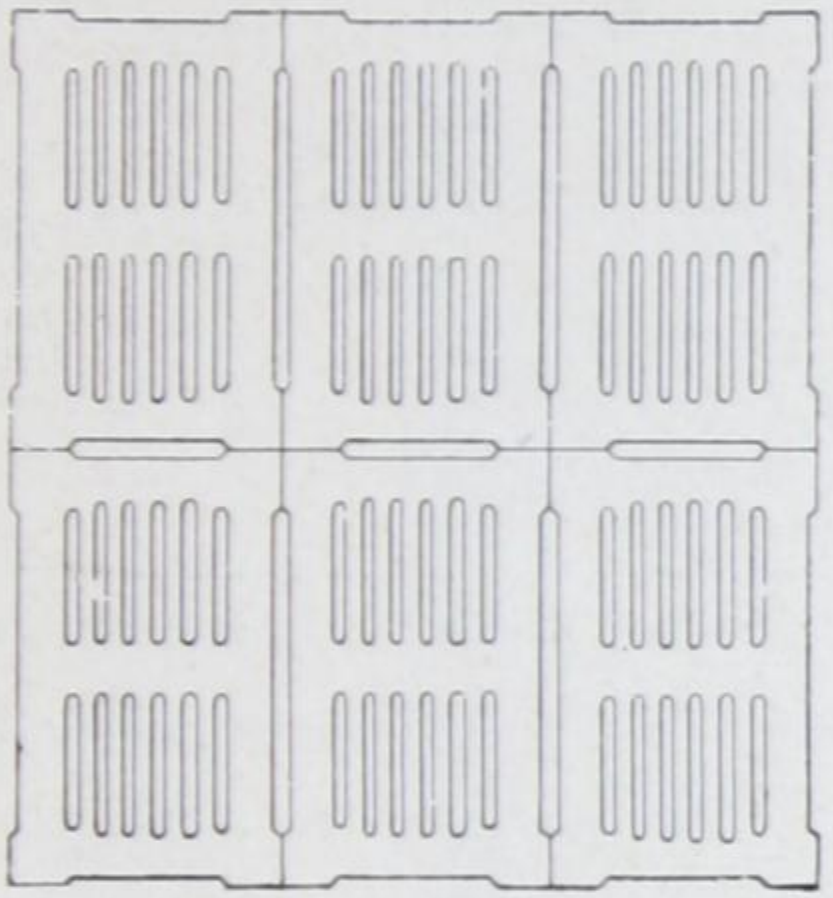


Diagram 4.—Vertical, Tiered

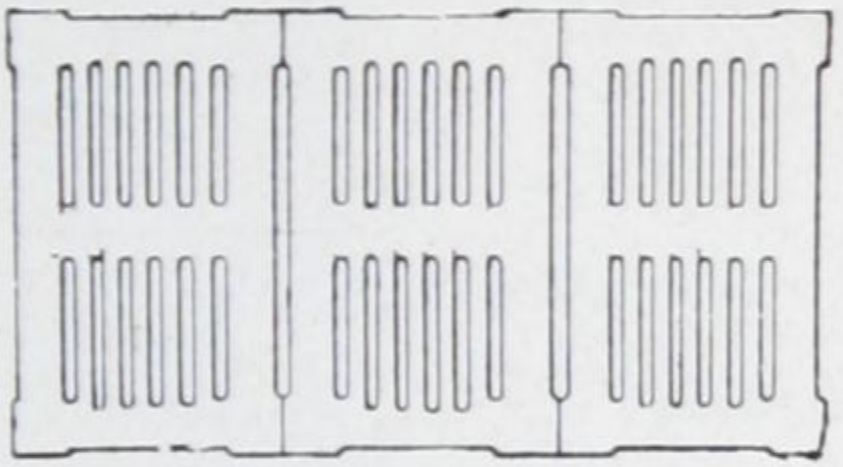


Diagram 3.—Vertical

CLUSTER

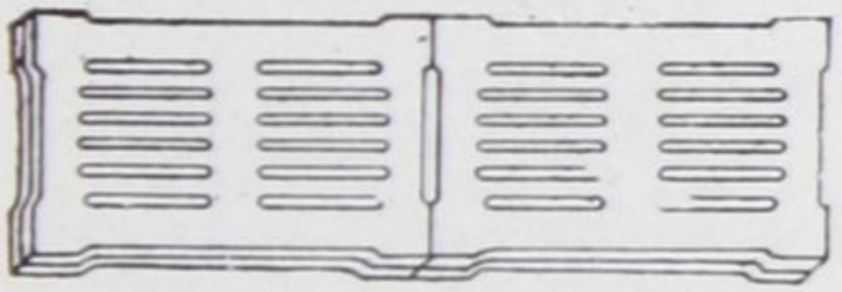


Diagram 5.—Horizontal Cluster

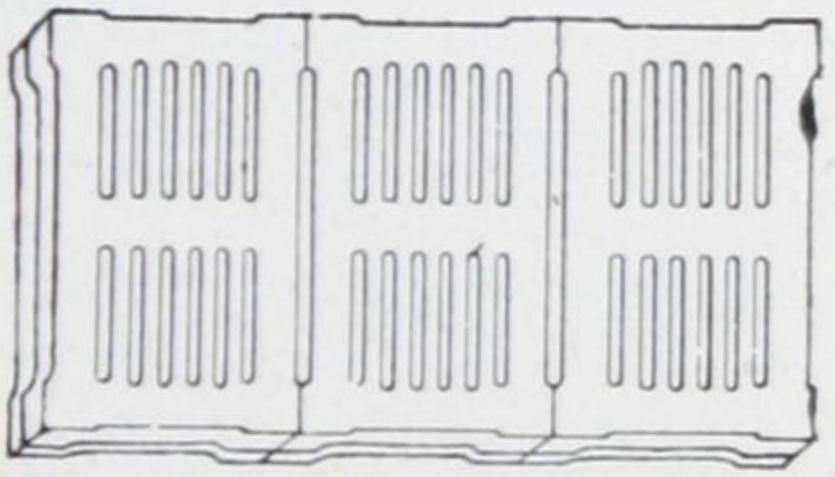


Diagram 6.—Vertical Cluster

Orders should be accompanied by sketch showing tappings desired.

NOTE:—For Measurements, see Page 76.
For Prices and Capacities, see Radiator Section, Pages 53-72.

INSTRUCTIONS
for
ORDERING RADIATORS
and
RADIATOR REPAIRS

State plainly the catalogue name. Always mention number of columns and height of radiator required. Also, whether for Hot Water, Hot Water for Steam, or Steam Type. If Steam Type, state whether for one or two-pipe system. Give connections and size of tappings, right or left hand.

KING RADIATORS
OBSOLETE
TWO COLUMN—WATER OR STEAM
MALLEABLE SCREW NIPPLE CONNECTIONS

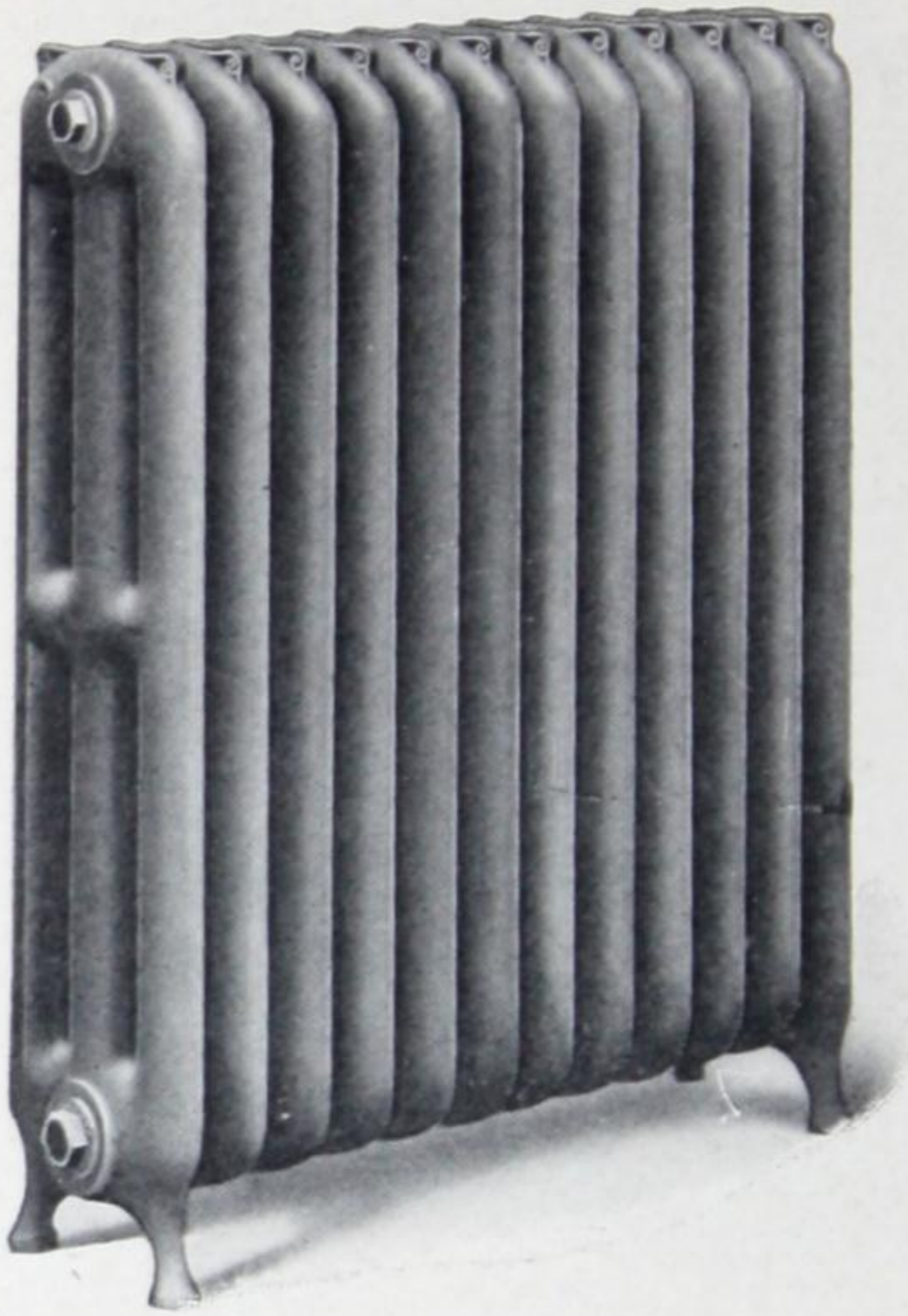
KING PATTERN
HEIGHTS, DIMENSIONS AND CAPACITIES

	Centre to Centre of Sections	Width		Distance	
		Sections	Legs	Floor to Centre of Opening	Between Centres of Twin Connections
Measurements	2½″	7¼″	7¼″	4″	3¼″

Heights	45″	38″	32″	26″	23″	20″
Square Feet per Section	5	4	3⅓	2⅔	2⅓	2

NOTE:—This pattern only made to order for repairs. For additional measurements See Roughing Section pages 75-76. For all other Radiators See pages 53-72.

KING RADIATORS
OBSOLETE
THREE COLUMN—WATER OR STEAM
MALLEABLE SCREW NIPPLE CONNECTIONS



KING PATTERN
HEIGHTS, DIMENSIONS AND CAPACITIES

	Centre to Centre of Sections	Width		Distance	
		Sections	Legs	Floor to Centre of Opening	Between Centres of Connections
Measurements	2½″	9″	9″	4½″	3¼″

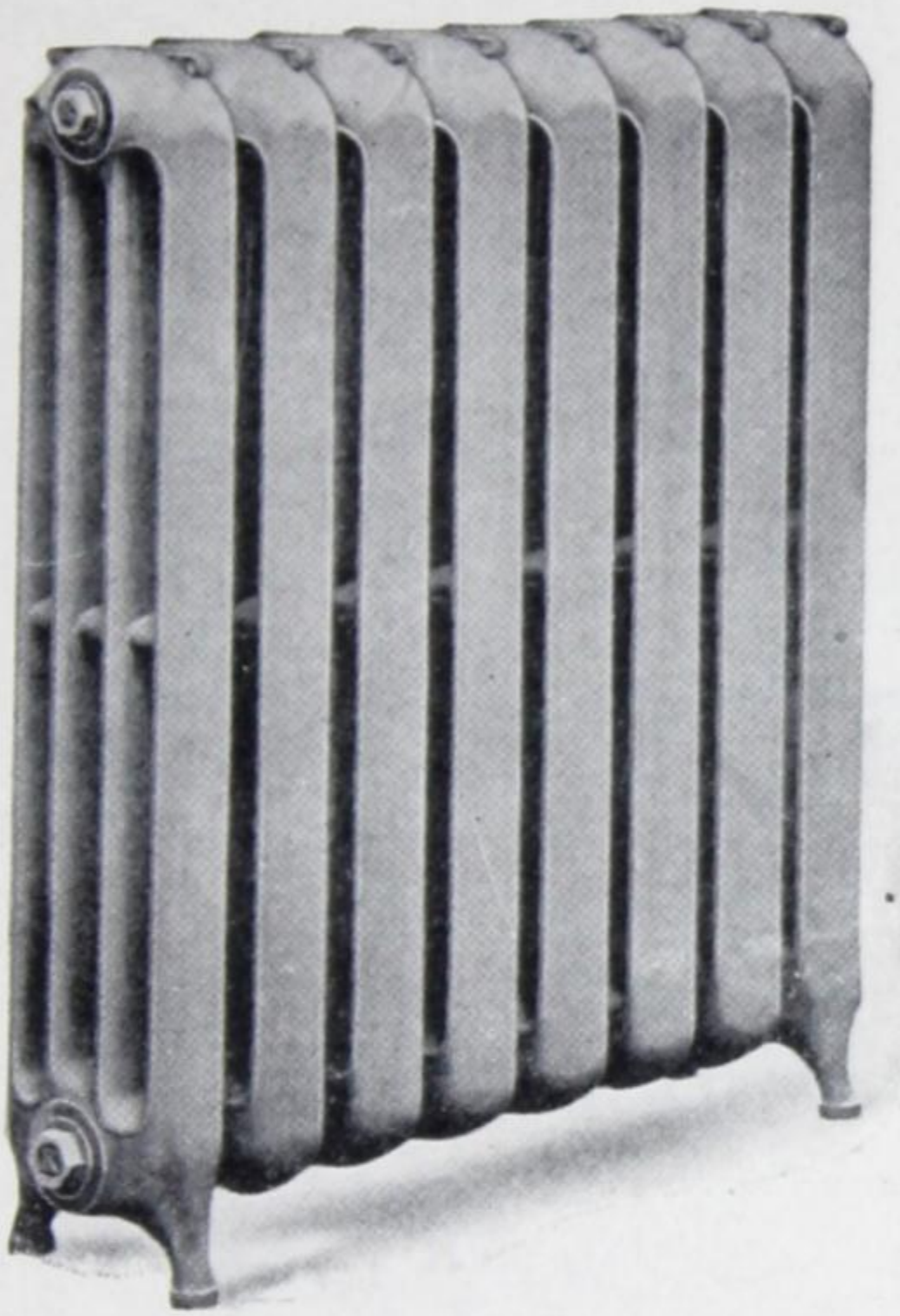
Heights	44″	38″	32″	26″	22″	18″
Square Feet per Section	6	5	4½	3¾	3	2¼

NOTE:—This pattern only made to order for repairs. For additional measuremen
See Roughing-in Section pages 75-76. For all other Radiators See pages 53-72

KING RADIATORS

FOUR COLUMN—WATER OR STEAM

MALLEABLE SCREW NIPPLE CONNECTIONS



KING PATTERN

HEIGHTS, DIMENSIONS AND CAPACITIES

	Centre to Centre of Sections	Width		Distance	
		Sections	Legs	Floor to Centre of Openings	Between Centres of Connections
Measurements	4″	8¾″	8¾″	4″	3¼″

Heights	42″	38″	32″	26″	20″	16″
Square Feet per Section	9⅔	8	6½	5	4	2½

For additional measurements see Roughing-in Section, pages 75-76.
For all other Radiators see pages 53-72.

RADIATOR VALVES

Size Inches	½	¾	1	1¼	1½	2
N P. Quick Opening "Angle" no union	2.95	3.25	3.90	5.00	6.30	10.50
N P. Quick Opening "Angle" with union	3.25	3.70	4.50	5.75	7.30	12.00
N P. Radiator Elbows with union	1.75	2.00	2.50	3.30	4.25	7.20
N P. Jenkins Disc "Angle" no union	3.40	3.85	4.50	5.65	7.40	12.10
N P. Jenkins Disc "Angle" with union	3.70	4.30	5.10	6.40	8.40	13.60
N P. Jenkins Disc "Globe" no union	3.40	3.85	4.50	5.65	7.40	12.10
N P. Jenkins Disc "Lockshield" no union	3.40	3.85	4.50	5.65	7.40	12.10
N P. Jenkins Disc "Lockshield" with union	3.70	4.30	5.10	6.40	8.40	13.60
N P.W.W. Standard "Angle" no union	4.00	4.45	5.25	6.40	8.40	13.35
N P. W. W. Standard "Angle" with union	4.30	4.90	5.85	7.15	9.40	14.85
N P.W.W. Standard "Lockshield" no union	4.00	4.45	5.25	6.40	8.40	13.35
N P.W.W. Standard "Lockshield" with union	4.30	4.90	5.85	7.15	9.40	14.85
N P.W.W. Gate no union	2.40	3.00	3.85	5.00	6.60	9.65
N P. W.W. Gate with union	3.65	4.25	5.20	6.60	9.00	12.80

Genuine Jenkins Radiator Valves same list as Jenkins Disc.

RADIATOR AIR VALVES

DESCRIPTION	PRICE
Compression Wood Wheel	Per doz. 2.50
Compression Metal Wheel	" 4.50
Compression Loose Key	" 3.75
Loose Key "extra"	" 2.50
"Warco" Automatic Steam	List each 1.75
No. 1 Hoffman Automatic Siphon Air Valve	Per doz. 22.80
No. 3 Hoffman Automatic "Air Line" Valve	" 30.00
No. 4 Hoffman Junion Quick Vent Air Valve "For Mains"	" 33.60
Government Pattern Lockshield ⅛	" 11.25
Government Pattern Lockshield ¼	" 15.00

STANDARD BRASS VALVES, BRASS AND IRON COCKS AND FOOT VALVES

Sizes	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
	$ c	$ c	$ c	$ c	$ c	$ c	$ c	$ c	$ c	$ c	$ c	$ c	$ c
Standard Globe and Angle Valves	...	72	77	1 00	1 26	1 80	2 52	3 50	5 30	10 00	14 40	26 50	36 00
" Peet Gate Valves	...	....	....	1 30	1 75	2 50	3 50	5 00	7 50	.....	.....	.....	.....
" Gate Valves	..	1 15	1 45	1 65	2 05	2 80	3 70	5 00	7 30	13 00	19 00		
Jenkins Disc Globe and Angle Valves		1 10	1 25	1 60	2 20	2 80	4 00	5 50	8 75	15 75	22 00	.. ..	.....
Standard Horizontal Check Valves	65	65	70	90	1 15	1 60	2 25	3 15	4 75	9 00	13 00	24 00	32 50
" Vertical and Angle Check Valves	....	72	77	1 00	1 26	1 80	2 52	3 50	5 30	.....	.....	.....	.....
" Swing Check Valves	....	...	1 80	2 00	2 25	2 80	3 65	4 75	6 75	15 00	24 00	.....	.....
Jenkins Disc Check Valves	....	1 10	1 20	1 30	1 90	2 60	3 60	5 00	7 50	13 50	.....	.....	.....
Discs for Jenkins Valves	—	6	8	8	10	12	18	24	36	48	80	100	120
Steam Cocks, Square Head, Brass	....	85	1 00	1 25	1 70	2 35	3 70	4 85	7 30	14 50	22 50	38 50	50 00
" " " Three Way, Brass	....	....	2 10	2 50	3 00	3 75	5 75	7 15	11 00	18 75	26 00	50 00	70 00
" " " Iron	..	85	85	90	1 05	1 30	1 60	1 95	2 70	4 40	6 75	12 00	15 50
" " " " with Brass Washer	....	....	....	1 00	1 20	1 55	1 95	2 35	3 20	5 15	7 75	14 00	19 00
" " " " " " Plug	....	....	....	1 30	1 60	1 90	2 65	3 75	5 25	8 75	13 00	27 50	36 50
" " " " Three Way	....	....	....	...	1 65	1 80	2 05	2 65	3 65	5 35	7 50	14 00	19 00
" " " " " " with Brass	Washer	....	....	1 80	2 05	2 40	3 05	4 15	6 10	8 50	16 00	22 50	
" " " " " " " "	Plug	....	....	2 20	2 40	3 10	4 50	6 25	9 75	13 75	30 00	40 00	
Pet Cocks, T Handle	40	45	50	60	....	....	....	....	.....	.....	....	.....	.....
" " L "	55	60	65	75	...	....	....	....	.....	.....	.....	.....	.....
Foot Valves, Iron, Black	....	....	....	....	1 15	1 30	1 40	1 90	2 40	3 30	3 90	5 60	7 30
" " " Galvanized	....	...	...	...	1 75	2 00	2 10	2 85	3 60	5 00	5 75	8 50	11 00

COMPRESSION BIBBS AND STOP COCKS

Sizes		1/4	3/8	1/2	3/4	1
Compression Bibb, 1 P. Finished	per doz.	$18.00	$18.60	$19.80	$33.00	$60.00
" " Hose and Iron Finished	"	.....	21.60	22.80	36.00	67.20
" Stop Cock, I. P. Finished	"	15.60	16.20	19.80	33.00	60.00
Comp. S. & W. Cock, I. P. Rg'h, including S.B.	"	.....	25.80	29.40	43.80	76.80
Rough Stop Cocks, T and L Handle	"	19.80	20.40	21.00	36.00	32.80
Rough, S. & W. " " " "	"	20.40	21.00	21.60	36.60	54.00

STANDARD IRON BODY VALVES

Sizes		2	2½	3	3½	4	4½	5	6	7	8	10	12
		each	each	each	each	each	each	each	each	each	each	each	each
		$ c.	$ c.	$ c.	$ c.	$ c	$ c	$ c.	$ c	$ c.	$ c.	$ c.	$ c.
Globe & Ang. Standard without Yoke	Scd.	5 40	7 35	9 80	.....	.....	.....	.....	.....	.....	.....	.....	.....
" " " "	Flg'd	7 00	9 00	12 50	.....	.....	.....	.....	.....	.....	.....	.....	.....
" " with "	Scd.	7 00	9 00	12 50	15 25	19 00	24 00	27 00	37 50	63 00	72 00	114 00	170 00
" " " "	Flg'd	8 60	10 75	15 00	18 50	22 50	27 50	31 00	42 00	68 00	77 00	123 00	187 00
Globe&Ang.Jenk.Disc without Yoke	Scd.	7 25	11 00	16 00	.....	.....	.....	.....	....	.....	.....	.....	.....
" " " " "	Flg'd	8 50	13 00	18 00	.....	.....	.....	.....	.....	.....	.....	.....	.....
" " " with "	Scd.	10 00	12 00	16 75	19 50	24 00	32 00	40 00	48 00	80 00	90 00	130 00	185 00
" " " " "	Flg'd	11 75	14 00	18 50	21 50	26 00	34 00	42 00	50 00	80 00	90 00	130 00	185 00
Horizontal Check Valves.....	Scd.	3 60	6 50	8 90	12 25	14 25	19 00	22 00	30 00	45 00	57 00	105 00	155 00
Angle "	Scd.	3 60	6 50	8 90	12 25	14 25	19 00	22 00	30 00	45 00	57 00	105 00	155 00
Horizontal "	Flgd.	5 25	8 25	11 50	15 50	18 00	22 50	26 00	35 00	50 00	62 00	115 00	175 00
Angle "	Flg'd	5 25	8 25	11 50	15 50	18 00	22 50	26 00	35 00	50 00	62 00	115 00	175 00
Vertical "	Scd.	7 00	9 50	12 50	17 00	21 00	30 00	33 00	40 00	62 00	73 00	125 00	.....
" "	Flg'd	8 75	11 50	15 00	20 00	25 00	33 50	37 00	45 00	67 00	78 00	135 00	.....
Cross Safety Val. Scd., ea., size 1¼ $5, 1½	$5 80	7 80	13 25	17 25	23 00	28 75	34 50	41 50	57 75	93 50	132 00	.....	.....
Angle " " " 1¼ 5, 1½	5 80	7 80	13 25	17 25	23 00	28 75	34 50	41 50	57 75	93 50	132 00	.....	.....
Cross "	Flg'd	10 25	16 00	21 50	27 50	34 00	40 00	48 00	65 00	100 00	140 00	.....	.....
Angle "	Flg'd	10 25	16 00	21 50	27 50	34 00	40 00	48 00	65 00	100 00	140 00	.....	.....
Swing Check Valves.....	Scd.	.....	12 00	13 50	17 50	20 00	26 00	30 00	36 00	55 00	70 00	110 00	160 00
" " "	Flg'd	.....	14 50	17 00	21 00	24 00	30 00	34 00	41 00	60 00	75 00	115 00	168 00
Expansion Joints, I. B.....	Scd.	7 00	8 00	10 00	14 00	18 00	30 00	38 00	40 00	70 00	100 00	160 00	225 00
" " "	Flg'd	15 00	16 00	18 50	25 00	30 00	40 00	48 00	55 00	80 00	110 00	175 00	250 00
" " " 6 in. Traverse	Scd	11 00	13 00	17 50	25 00	30 00	40 00	45 00	55 00	.....	.....	.....	.....
" " " " "	Flg'd	18 00	20 00	25 00	35 00	40 00	50 00	55 00	65 00	.....	.....	.....	.....
Jenkin's Disc Horz. Check Valves...	Scd.	.....	10 50	14 00	17 00	20 00	25 00	30 00	40 00	.....	.....	.....	.....
" " " " " ...	Flg'd	.....	12 50	16 50	20 00	23 00	28 00	33 00	43 00	.....	.....	.....	.....
Standard Gate I. B., Plain.....	Scd.	10 00	11 50	14 00	17 00	19 00	24 00	27 50	32 50	45 00	54 00	90 00	125 00
" " " "	Flg'd	12 00	13 50	16 50	19 50	23 00	28 00	31 50	36 50	49 00	58 00	95 00	133 00
" " " " O. S. & Y..	Scd.	17 50	19 00	22 00	25 00	30 00	37 00	42 00	48 00	64 00	80 00	122 00	160 00
" " " " " " ..	Flg'd	19 50	21 00	24 50	27 50	34 00	41 00	46 00	52 00	68 00	84 00	127 00	168 00

The above list Standard for Kerr Keystone & Jenkins Type K.

CAST IRON FITTINGS

Sizes.	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	9	10	12
	c.	c.	c.	c.	c.	c.	c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Elbows, C. I.	..	05	06	08	10½	16	20	28	50	75	1 05	1 20	1 75	2 00	2 75	4 70	6 75	9 00	13 50	20 00
" " Reducing	..	..	07	09	12	18	23	32	60	85	1 20	1 40	2 00	2 30	3 15	5 40	7 75	10 50	15 50	23 00
" " R. and L.	..	..	07	09	12	18	23	32	60	85	....	....	....	....	....	....	....	....	....	....
" " 45°	..	..	07	10	12	19	24	34	60	90	1 25	1 45	2 20	2 50	3 45	5 90	8 50	11 25	17 00	25 00
Tees	..	..	09	12	15	23	29	41	73	1 10	1 50	1 75	2 55	3 00	4 00	6 80	9 75	13 00	19 50	29 00
" Reducing	..	..	10	14	17	27	33	47	83	1 25	1 75	2 00	2 95	3 50	1 60	7 80	11 25	15 00	22 50	33 50
Crosses	..	..	16	22	27	42	53	75	1 30	2 00	2 70	3 15	4 60	5 50	7 25	12 25	17 50	23 50	35 00	52 50
" Reducing	..	..	18	25	30	46	60	83	1 45	2 20	3 00	3 50	5 00	6 00	8 00	13 50	19 25	26 00	38 50	58 00
Return Bends, Close	..	..	18	20	22	28	40	57	1 20	1 70	....	5 00	....	....	....	....	....	....	....	....
" " Open	.	..	.	26	30	40	55	80	1 35	2 50	....	6 50	....	....	....	....	....	....	....	....
" " Pitched	..	..	..	..	26	33	...	....	....	....	....	....	....	....	....	....	....	....	....	....
Caps, C. I.	..	..	..	.	...	...	...	26	40	54	75	87	1 05	1 20	1 55	2 50	2 35	4 75	5 50	7 00
Reducers, C. I.	.	..	..	..	...	...	...	43	60	80	1 00	1 35	1 85	2 00	2 70	5 35	6 75	8 35	10 00	15 00
" Eccentric, C. I.	..	..	..	..	...	...	...	1 00	1 50	2 40	3 00	4 00	5 00	6 00	8 00	9 00	11 00	12 50	14 00	18 00
Locknuts, C. I.	..	..	..	..	...	...	...	25	27	34	47	64	85	90	1 30	1 70	2 35	2 70	3 00	4 00
Couplings, W. I.	05	06	07	10	13	17	21	28	40	60	85	1 00	1 50	1 65	2 40	3 25	4 25	5 50	7 50	10 00
Hexagon R. & L. Nipples	..	..	..	25	30	40	50	70	....	....	....	....	....	....	....	....	....	....	....	....
Plugs, R. H.	02	02	02	03	04	05	07	10	18	25	38	42	65	88	1 20	1 85	2 75	3 25	3 75	5 00
" Left	..	..	..	06	08	09	11	15	....	....	....	....	....	....	....	....	....	....	....	....
" R. H., Galvanized	04	04	04	06	08	10	14	20	36	50	76	84	....	....	....	....	....	....	....	....
" Solid	..	..	04	06	08	09	11	15	27	38	57	63	1 00	1 35	1 80	....	....	....	....	....
" Countersunk	..	..	04	06	08	09	11	15	30	40	...	....	....	....	....	....	....	....	....	....
Bushings. R. H.	..	04	04	05	06	07	09	14	21	30	40	50	75	93	1 25	1 87	2 75	3 25	3 75	5 00
" Left	..	08	08	10	12	14	18	28	....	....	..	....	....	....	....	....	....	....	....	....
" R. H., Galvanized.	..	08	08	10	12	14	18	28	42	60	80	1 00	....	....	....	....	....	....	....	....
" Faced	..	08	09	11	13	17	22	32	48	70	1 20	1 50	2 10	2 60	3 75	....	....	....	....	....
O/S Division Tees	..	..	.	..	60	80	90	1 20	2 00	....	....	....	....	....	....	....	....	....	....	....
Eureka Circulating Tees	..	..	..	..	...	...	...	90	1 30	1 50	1 90	2 20	3 20	3 70	4 90	....	15 00	....	....	....
Range Boiler Couplings	..	..	60	75	...	...	...	....	...	....	....	....	....	....	...	....	....	....	....	....
Crossovers, Black	..	..	20	30	45	...	...	....	....	....	....	....	....	....	....	....	....	....	....	....
" Galvanized	..	..	25	40	60	..	...	....	....	....	...	....	....	....	.	....	....	....	....	
Bushings Eccentric	..	..	..	..	..	22	25	27	42	60	80	1 00	1 50	1 58	2 50	3 75	5 50	6 50	7 50	10 00
C. J. Y. Bend	..	..	20	28	34	54	66	94	1 66	2 50	3 50	4 00	5 90	7 00	9 20	15 60	22 50	.....	45 00	67 00

LONG SWEEP WATER FITTINGS

Sizes	1	1 ¼	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
	c.	$ c.	$ c.	$ c.	$ c	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
No. 1 Water Elbows, CI.....	32	40	55	80	1 20	2 25	3 25	3 50	5 50	6 50	8 75	13 00	17 00	25 50	30 00	40 00
No. 2 Dbl. Water Elbows	64	80	1 10	1 60	2 40	4 50	6 50	7 00	11 00	13 00	17 50	26 00	34 00	51 00	60 00	80 00
No. 3 Water Tees	48	60	82	1 20	1 80	3 40	4 90	5 25	8 25	9 75	13 25	19 50	25 50	38 00	45 00	60 00
No. 4 Water Crosses.	85	1 10	1 50	2 15	3 20	6 00	8 75	9 50	15 00	17 50	24 00	35 00	45 00	68 00	80 00	107 00
No. 1 Water Elbows, Red'g.....	48	60	83	1 20	1 80	3 38	4 88	5 25	8 25	9 75	13 13	19 50	25 50	38 25	45 00	60 00
No. 2 Dbl. W. Elbows Red g....	96	1 20	1 65	2 40	3 60	6 75	9 75	10 50	16 50	19 50	26 25	39 00	51 00	76 50	90 00	120 00
No. 3 W. Tees Red'g.....	72	90	1 23	1 80	2 70	5 10	7 35	7 88	12 38	14 63	19 88	29 25	38 25	57 00	67 50	90 00
No. 4 Water Crosses Red'g.....	..	1 65	2 25	3 23	4 80	9 00	13 13	14 25	.....	26 25	36 00	52 50	67 50	102 00	120 00	160 50

STANDARD UNIONS

Size.....Inches	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
Price.....Each	.18	.18	.20	.22	.27	.33	.46	.58	75	1 55	2 10	3 65	4 35
Price, Galvanized.....Each	.27	.27	.30	.33	.40	.50	.70	.90	1 15	2 35	3 15	5 50	6 50

JEFFERSON OR DART UNIONS

Size.....Inches	⅛ & ¼	⅜	½	¾	1	1¼	1½	2	2½	3
Price.....Each	.30	.40	.50	.60	.80	1.20	1.60	2.00	3.20	4.80
Price, Galvanized.....Each	.39	.52	.65	.78	1.04	1.56	2.08	2.60	4.16	6.24

FLANGE UNIONS

Size.....Inches	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8	10	12
Standard.....	.40	.46	.52	.64	.78	1.00	1.25	1.50	1.80	2.10	2.70	3.15	3.95	5.50	7.00	11.50	16.00
Dart.....	....	....	.80	1.20	1.60	2.00	3.20	4.80	6.00	7.50	8.75	10.00	12.50	15.00	18.00	28.80	.....

GRABLER RING HANGERS

Size	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8	10
	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	$ c.
Rings only	14	14	16	18	20	22	24	26	30	32	34	36	40	63	88	1.38

GRABLER STEEL HOOK PLATES

Size	1	1¼	1½	2
Number of Hooks to strip	30	30	25	20
Price per strip	$2.50	$3.25	$3.75	$4.25

GRABLER BAR, LAG SCREWS AND BEAM CLAMPS

No.	1	2	3	4	5
Size pipe	½–1½	2—3	3½—6	7—8	9–12
Bar, 10 ft. Lengths . . per foot	.08	.09	.12	.20	.28
Lag Screw . . . . . each	.10	.12	.14	.20	.25
Beam Clamp . . . . . "	.25	.30	.35	.50	.70

Grabler Bar No. 1, ⅞ in.; No. 2, 1 in.; No. 3, 1⅛ in.; No. 4, 1¼ in.; No. 5, 1 5/16 in. wide

EXPANSION (RING) PIPEHANGERS

Size	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8
	c.	c.	c.	c.	c.	c.	c.	c.	c.	c.	$ c.	$ c.	$ c.	$ c.
Complete . . . . . each	17	18	19	25	29	36	44	55	63	90	1.12	1.35	1.80	2.25
Rings only	08	12	15	20	25	30	40	50	60	80	1.00	1.25	1.70	2.15
Plates	08	08	08	09	09	10	10	10	10	10	.10	.10	.10	.10
Buttons	06	06	06	07	07	08	08	08	08	08	.08	.08	.08	.08

WROUGHT IRON NIPPLES

BLACK IRON—RIGHT HAND

Length in inches						Size, inches	Prices		Price of Extra Long Nipples. Length in inches								
Close	Short	Long					Close or Short	Long	4	5	6	7	8	9	10	11	12
						$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
3/4	1 1/2	2	2 1/2	3	3 1/2	1/8	04	06	07	08	10	12	14	15	17	18	19
7/8	1 1/2	2	2 1/2	3	3 1/2	1/4	04	06	07	08	10	12	14	15	17	18	19
1	1 1/2	2	2 1/2	3	3 1/2	3/8	04	06	07	08	10	12	14	15	17	18	19
1 1/8	1 1/2	2	2 1/2	3	3 1/2	1/2	05	07	08	10	12	14	16	18	20	22	23
1 3/8	2	2 1/2	3	3 1/2	4	3/4	06	09	.....	11	13	17	18	20	22	24	26
1 1/2	2	2 1/2	3	3 1/2	4	1	08	13	.....	15	18	23	25	28	31	34	36
1 5/8	2 1/2	3	3 1/2	4	4 1/2	1 1/4	11	17	.....	20	24	29	33	36	40	44	47
1 3/4	2 1/2	3	3 1/2	4	4 1/2	1 1/2	13	20	.....	25	29	36	40	45	50	54	59
2	2 1/2	3	3 1/2	4	4 1/2	2	18	27	.....	32	38	50	54	59	65	72	77
2 1/2	3	3 1/2	4	4 1/2	5	2 1/2	39	59	.....	.....	68	90	97	1 06	1 17	1 26	1 35
2 1/2	3	3 1/2	4	4 1/2	5	3	48	72	.....	.....	85	1 08	1 20	1 33	1 45	1 58	1 70
2 3/4	4	4 1/2	5	5 1/2	6	3 1/2	75	1 05	.....	.....	.....	1 30	1 45	1 60	1 75	1 90	2 05
3	4	4 1/2	5	5 1/2	6	4	85	1 20	.....	.....	.....	1 52	1 69	1 87	2 05	2 22	2 40
3	4	4 1/2	5	5 1/2	6	4 1/2	1 25	1 70	.....	.....	.....	2 25	2 50	2 75	2 95	3 17	3 40
3 1/4	4 1/2	5	5 1/2	6	6 1/2	5	1 55	2 45	.....	.....	.....	2 58	2 83	3 10	3 35	3 60	3 85
3 1/4	4 1/2	5	5 1/2	6	6 1/2	6	1 85	2 90	.....	.....	.....	3 05	3 35	3 70	4 00	4 30	4 65
3 1/2	5	.....	.....	.....	.....	7	3 20	.....	.....	.....	.....	3 60	4 05	4 45	4 90	5 30	5 75	6 15
3 1/2	5	.....	.....	.....	.....	8	3 55	.....	.....	.....	.....	4 05	4 55	5 05	5 50	6 00	6 50	7 00
4	5	.....	.....	.....	.....	9	5 25	.....	.....	.....	.....	.....	.....	6 50	7 10	7 75	8 40	9 00
4	5	.....	.....	.....	.....	10	6 75	.....	.....	.....	.....	.....	.....	8 25	8 90	9 75	10 40	11 15
4	5	.....	.....	.....	.....	12	8 00	.....	.....	.....	.....	.....	.....	10 00	10 80	11 75	12 70	13 65

Nipples made to order from extra Heavy Pipe at double above list.

WROUGHT IRON NIPPLES
BLACK IRON—RIGHT AND LEFT

Length in Inches.						Size, Inches	Prices		Prices of Extra Long Nipple. Length in Inches.								
Close.	Short.	Long.					Close or Short	Long	4	5	6	7	8	9	10	11	12
							$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
$\frac{3}{8}$–$\frac{1}{2}$–$\frac{3}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{8}$–$\frac{1}{4}$–$\frac{1}{2}$	05	08	09	11	13	16	18	20	23	25	27
$\frac{3}{8}$–$\frac{1}{2}$–$\frac{3}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{8}$–$\frac{1}{4}$–$\frac{1}{2}$	05	08	09	11	13	16	18	20	23	25	27
1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{3}{8}$–$\frac{1}{2}$–$\frac{3}{4}$	05	08	09	11	13	16	18	20	23	25	27
$1\frac{1}{8}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{2}$–$\frac{3}{4}$–1	07	10	11	13	16	18	21	24	27	29	31
$1\frac{3}{8}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$\frac{3}{4}$–1–$1\frac{1}{4}$	08	12	....	15	17	23	25	27	29	32	35
$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	1–$1\frac{1}{4}$–$1\frac{1}{2}$	11	18	....	20	24	31	33	37	41	45	48
$1\frac{5}{8}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	$1\frac{1}{4}$–$1\frac{1}{2}$–2	15	23	....	27	32	39	45	50	55	60	65
$1\frac{3}{4}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	$1\frac{1}{2}$–2–$2\frac{1}{2}$	18	27	....	34	39	48	52	60	67	72	80
2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	2–$2\frac{1}{2}$–3	24	36	....	43	51	67	72	80	87	96	1 03
$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	$2\frac{1}{2}$–3–$3\frac{1}{2}$	52	79	....	....	91	1 20	1 30	1 40	1 55	1 68	1 80
$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	3–$3\frac{1}{2}$–4	65	96	....	....	1 13	1 44	1 60	1 77	1 93	2 10	2 27
$2\frac{3}{4}$	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	$3\frac{1}{2}$–4–$4\frac{1}{2}$	1 00	1 40	....	....	....	1 75	1 95	2 15	2 35	2 55	2 75
3	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	4–$4\frac{1}{2}$–5	1 15	1 60	....	....	....	2 00	2 25	2 50	2 75	3 00	3 25

WROUGHT IRON NIPPLES

GALVANIZED—RIGHT HAND

Length in Inches.						Sizes, Inches	Prices		Prices of Extra Long Galvanized Nipples. Lengths in Inches.								
Close.	Short.	Long.					Close or Short	Long	4	5	6	7	8	9	10	11	12
							c.	c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
3/4	1 1/2	2	2 1/2	3	3 1/2	1/8	06	11	12	15	17	21	24	26	29	31	34
7/8	1 1/2	2	2 1/2	3	3 1/2	1/4	06	11	12	15	17	21	24	26	29	31	34
1	1 1/2	2	2 1/2	3	3 1/2	3/8	06	11	12	15	17	21	24	26	29	31	34
1 1/8	1 1/2	2	2 1/2	3	3 1/2	1/2	06	11	13	16	18	23	26	28	31	33	36
1 3/8	2	2 1/2	3	3 1/2	4	3/4	08	14	.....	18	21	26	29	32	35	38	41
1 1/2	2	2 1/2	3	3 1/2	4	1	11	19	.....	24	28	34	38	42	47	51	55
1 5/8	2 1/2	3	3 1/2	4	4 1/2	1 1/4	17	29	.....	32	38	45	51	57	63	69	75
1 3/4	2 1/2	3	3 1/2	4	4 1/2	1 1/2	21	35	.....	39	46	55	63	70	77	84	91
2	2 1/2	3	3 1/2	4	4 1/2	2	27	47	.....	52	61	74	83	93	1 03	1 13	1 23
2 1/2	3	3 1/2	4	4 1/2	5	2 1/2	56	86	.....	.....	1 00	1 26	1 41	1 56	1 71	1 86	2 01
2 1/2	3	3 1/2	4	4 1/2	5	3	70	1 10	.....	.....	1 30	1 60	1 80	2 00	2 20	2 40	2 60
2 3/4	4	4 1/2	5	5 1/2	6	3 1/2	1 20	1 70	.....	.....	.....	2 10	2 35	2 60	2 85	3 15	3 40
3	4	4 1/2	5	5 1/2	6	4	1 35	1 87	.....	.....	.....	2 30	2 60	2 90	3 20	3 50	3 80
3	4	4 1/2	5	5 1/2	6	4 1/2	1 85	2 60	.....	.....	.....	3 30	3 65	4 05	4 45	4 85	5 25
3 1/2	4 1/2	5	5 1/2	6	6 1/2	5	2 30	3 15	.....	.....	.....	3 75	4 20	4 60	5 00	5 40	5 85
3 1/2	4 1/2	5	5 1/2	6	6 1/2	6	2 80	4 25	.....	.....	.....	4 50	5 00	5 55	6 05	6 60	7 15
4	5	6	.....	.....	.....	7	4 25	.....	.....	.....	.....	5 65	6 35	7 05	7 75	8 45	9 20
4	5	6	.....	.....	.....	8	5 00	.....	.....	.....	.....	6 65	7 50	8 35	9 25	10 10	10 95

WROUGHT IRON NIPPLES

GALVANIZED—RIGHT AND LEFT

Length in Inches.						Size, Inches	Prices		Price of Extra Long Nipples. Length in Inches.								
Close.	Short	Long.					Close or Short	Long	4	5	6	7	8	9	10	11	12
							$ c.	$ c.	c.	c.	$ c.	$ c.	$ c.	$ c	$ c.	$ c.	$ c.
$\frac{3}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{8}$	08	13	15	18	21	26	29	32	37	40	43
$\frac{7}{8}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{4}$	08	13	15	18	21	26	29	32	37	40	43
1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{3}{8}$	08	13	15	18	21	26	29	32	37	40	43
$1\frac{1}{8}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$\frac{1}{2}$	11	16	18	21	26	29	34	38	43	46	50
$1\frac{3}{8}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$\frac{3}{4}$	13	19	..	24	27	37	40	43	46	51	56
$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	1	18	29	...	32	38	50	53	59	66	72	77
$1\frac{5}{8}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	$1\frac{1}{4}$	24	37	...	43	51	62	72	80	88	96	1 08
$1\frac{3}{4}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	$1\frac{1}{2}$	29	43	...	54	62	77	83	96	1 07	1 51	1 25
2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	2	39	57	..	69	82	1 07	1 15	1 28	1 39	1 54	1 65
$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	$2\frac{1}{2}$	83	1 25	...	...	1 46	1 92	2 08	2 24	2 48	2 69	2 89
$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	3	1 04	1 54	...	....	1 81	2 30	2 56	2 83	3 09	3 36	3 63
$2\frac{3}{4}$	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	$3\frac{1}{2}$	1 60	2 24	...	....	....	2 80	3 12	3 44	3 76	4 08	4 40
3	4	$4\frac{1}{2}$	5	$5\frac{1}{2}$	6	4	1 84	2 56	...	....	....	3 20	3 60	4 00	4 40	4 80	5 20

FLOOR AND CEILING PLATES

Size	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
No. 15 N.P. Steel 2 piece Floor and Ceiling Plates each....	25	26	27	28	32	35	38	45	65	80	1.00	1.25
No. 16 N.P. Steel 1 piece Ceiling Plates with set screw N.P. each.....			12	13	14	15	16	17				
No. 17 N.P. Steel 1 piece Floor Plates N.P. each.....			12	13	14	15	16	17				
C.I. Floor Plates plain each.....			6	6	8	11	14	16	24	30	35	42
C.I. Ceiling Plates plain, each.....			11	13	16	18	23	27	36	50	55	68
Spun Floor Plates N.P., per 100.....			14	14	18	22	30	35	42	55		
Spun Ceiling Plates set screw N.P., per 100.....			22	24	26	32	38	46	60	80		

GALVANIZED TELESCOPIC FLOOR SLEEVES

Size of Pipe	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8
Minimum Length Ins.....	14	14	14	14	14	14	14	14	14	14	14	14
Maximum Length Ins.....	24	24	24	24	24	24	24	24	24	24	24	24
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
List Price.....	1 05	1 20	1 35	1 50	1 80	2 10	2 50	3 00	3 75	4 50	5 25	6 75

RING STAYS

Size		⅜	½	¾	1	1¼	1½	2
		$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Short Black.....	per 100	5 00	5 00	5 80	7 75	10 00	14 00	22 00
Short Galvanized...	"	6 50	6 50	7 00	9 00	12 00	16 00	25 00
Long Black.....	"	6 50	6 50	8 00	10 00	12 00	15 00	24 00
Long Galvanized...	"	8 00	8 00	10 00	12 00	14 00	18 00	27 00

SECTIONAL PIPE COVERING

STANDARD PRICE LIST

STANDARD THICKNESS						EXTRA THICKNESSES			
Inside Diam. of Pipe	Price per Lineal foot	Elbows	Tees	Crosses	Globe Valves	1½ in. thick per Lineal foot	2 inches thick per Lineal foot	Double Stan. thick per Lineal foot	3 inches thick Broken Joint per Lineal foot
½ in.	$ .22	$ .30	$ .36	$ .48	$ .54	$ .46	$ .75	$ .65	$1.20
¾ "	.24	.30	.36	.48	.54	.49	.80	.70	1.35
1 "	.27	.30	.36	.48	.54	.52	.85	.75	1.40
1¼ "	.30	.30	.36	.48	.51	56	.90	.80	1.45
1½ "	.33	.30	.36	.48	.54	.60	.95	.85	1.55
2 "	.36	.36	.42	.54	.60	.64	1.00	.90	1.65
2½ "	.40	.42	.48	.60	.78	.70	1.05	1.00	1.75
3 "	.45	.48	.54	.70	.96	.76	1.15	1.10	1.90
3½ "	.50	.54	.60	.80	1.20	.82	1.25	1.20	2.05
4 "	.60	.60	.75	.95	1.50	.88	1.35	1.40	2.20
4½ "	.65	.72	.90	1 10	1.85	.94	1.45	1.50	2.35
5 "	.70	.90	1.20	1.50	2 25	1 00	1.55	1.60	2.50
6 "	.80	1.30	1.60	2.00	2.80	1.10	1.70	1.80	2.70
7 "	1.00	1.80	2.20	2.80	3.60	1.20	1.85	2.25	2.90
8 "	1.10	2.40	3 00	3.60	4.40	1.35	2.00	2.50	3.15
9 "	1.20	3.00	3.80	4.40	5.30	1.50	2.20	2.70	3.40
10 "	1.30	3.60	4 60	5.20	6.20	1.65	2.40	2.90	3.65
12 "	1.85	....	.....	.....	.....	1.85	2.70	4.10	4.10

Above List Prices include the following styles of coverings:

Asbestos Fire—Felt, Magnesia, Vitribestos, Indented, Asbestoce, Air Cell, Eureka, Molded Asbestos, Perfection Wool Felt, Frost Proof, Anti-Sweat, Zero, Standard Brine, Ammonia, and Aqua Wool Felt.

MISCELLENEOUS COVERINGS, ETC.

SIZE	½ in.	¾ in.	1 in.
Hair Felt, 300 sq. ft. per roll per 100 sq. ft.....	⅜12.00	⅜14.00	⅜16.00

Asbestos Cement, per 100 lb. bag.....	$ 2.50
Mineral Wool, per 50 lb. bag.....	5.00
Asbestos Sheathing, per 100 square feet.....	10.00
Asbestos Wick, per ½ lb. ball.....	50
Candle Wick, per ⅙ lb. ball.....	.25

Sectional Pipe Covering supplied in sections 3′ o″ long.

COVERING BOILERS WITH ASBESTOS CEMENT

Number of Bags of Asbestos Plaster Required to Cover Boiler 1¼, 1½, or 2 in. Thick

NEW KING				ROYAL ROUND				ROYAL SQUARE				ROYAL SMOKELESS			
No.	1¼"	1½"	2"	No.	1¼"	1½"	2"	No.	1¼"	1½"	2"	No.	1¼"	1½"	2"
1	1	1	2	4–19	2	2	3	15–4	2	2	3	249	6	7	9
2	2	2	3	5–19	2	3	3	15–5	2	3	4	250	8	9	12
2½	2	2	3	4–22	2	3	4	15–6	3	3	4	251	8	10	13
3	2	2	3	5–22	3	3	4	19–5	3	3	4	338	9	10	14
3½	2	2	3	4–25	3	3	4	19–6	3	4	5	339	9	11	15
4	2	2	3	5–25	3	3	4	19–7	4	4	5	340	10	12	15
4½	2	3	3	4–28	3	3	4	25–5	3	4	5	341	10	12	16
5	2	3	4	5–28	3	3	4	25–6	3	4	5	342	10	12	16
5½	3	3	4	4–31	3	4	5	25–7	4	4	6	343	10	12	16
6	3	3	4	5–31	3	4	5	25–8	5	6	7	344	10	12	16
6A	3	3	4	4–34	3	4	5	36–5	5	6	8	345	10	12	16
6½	3	4	5	5–34	4	4	5	36–6	6	7	9	346	10	12	17
6½A	3	4	5	.....	.....	.....	.....	36–7	6	7	10	347	11	13	17
7	3	4	5	.....	.....	.....	.....	36–8	7	8	11	409	10	13	17
7½	4	4	5	.....	.....	.....	.....	36–9	7	9	12	410	10	13	17
8	4	4	6	.....	.....	.....	.....	48–6	8	10	13	411	11	14	18
8½	4	4	6	.....	.....	.....	.....	48–7	9	11	15	412	12	14	19
9	4	4	6	.....	.....	.....	.....	48–8	10	12	16	413	12	15	20
9½	4	5	6	.....	.....	.....	.....	48–9	12	14	18	414	13	16	21
.....	.....	.....	.....	.....	.....	.....	.....	48–10	14	17	20	548	13	16	22
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	549	14	18	24
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	550	15	20	25
.....	.....	.....	.....	"ROYAL" BUNGALOW HEATERS				.....	.....	.....	.....	551	15	21	25
.....	.....	.....	.....					.....	.....	.....	.....	552	16	21	26
.....	.....	.....	.....					.....	.....	.....	.....	553	16	22	26
.....	.....	.....	.....					.....	.....	.....	.....	554	17	23	28
.....	.....	.....	.....	118	18	115	15	.....	.....	.....	.....	555	18	24	30
.....	.....	.....	.....	1½	1½	1	1	.....	.....	.....	.....	556	20	25	30
.....	.....	.....	.....					.....	.....	.....	.....	557	21	26	30
.....	.....	.....	.....					.....	.....	.....	.....	558	22	26	32

MISCELLANEOUS

THERMOMETERS AND GAUGES

N.P. Hot Water Thermometer, Straight, each	.....
" " " Angle, "	.....
" " " Angle, "	.....
" Steam Thermometer with temperature and pressure scales, Straight, each	.....
" Steam Thermometer with temperature and pressure scales, Angle, each	.....
" Hot Water Thermometer, Round Dial, each	.....
N.P. Altitude Gauges, 4½ in. diameter, each	.....
" Low Pressure Steam Gauges, 4½ inch diameter, each	.....

GAUGE GLASSES

Diam.	Length	10	11	12	13	14	15	16	18	20
½ in.	each	.25	.27	.30	.32	.35	.37	.40	.45	.50
⅝ in.	"	.25	.27	.30	.32	.35	.37	.40	.45	.50
¾ in.	"	.30	.33	.36	.40	.43	.46	.49	.55	.62

EXPANSION TANKS

Made of Galvanized Iron, complete with Glass and Mountings

SIZE	12x24	12x30	14x30
Tanks complete, each	.....	.....	.....
Brass Mountings only—without glass, per set	.....	.....	.....
Automatic Expansion Tank, Plain Oak List	.....	.....	.....

SPECIALTIES

HONEYWELL GENERATORS

Size	Capacity Radiation Square Feet	Tappings Top	Tappings Side	Mercury Contained	Price
No. 1	For 1,200 and less	1	¾	3 lbs.	$25.00
No. 2	For 1,200 to 2,500	1	1	6½ lbs.	35.00
No. 3	For 2,500 to 3,500	1¼	1¼	11 lbs.	50.00
No. 4	For 10,000	1¼	1¼	15 lbs.	65.00
.....	Tank Circulator	...	...	.....	4.00

Note.—See page 78 for Honeywell Tappings.

GUIDE FOR ESTIMATING HOT WATER HEATING SYSTEM

Boiler.
Twin Headers.
Radiators (direct, indirect and direct-indirect).
Special Radiators (Angles, Dining-room Corners, High.
Casing Indirect Radiators.
Hanging Indirect Radiators.
Registers, Galvanized Iron and Tin Work.
Radiator Slabs and Tops.
Radiator Valves.
Air Valves.
Floor and Ceiling Plates.
Floor Sleeves.
Elbows, Tees, Pipe and Nipples.
Unions, Hangers, etc.
Blowoff and Supply.
Covering Boiler and Mains.
Expansion Tank and Automatic Feed Tank.
Thermometer and Altitude Gauge.
Decorating Radiators.
Smoke Pipe.
Valves on Mains, Risers and Dryers.
Hangers for Ceiling Radiators.
Freight and Cartage.
Board and Railway Fare.
Labor.
Carpenter Work.
Temporary Heat.

GUIDE FOR ESTIMATING STEAM SYSTEM

1. Boiler.
2. Twin Headers.
3. Radiators.
4. Thermostatic Radiator Traps.
5. Air Valves.
6. Radiator Valves.
7. Drip Traps.
8. Traps for Vents or Air Vents.
9. Ells, Tees, etc.
10. Unions.
11. Main Valves.
12. Pipe.
13. Main Covering.
14. Material for covering Boiler.
15. Hangers for Ceiling Radiators.
16. Hangers and assorted Nipples.
17. Floor and Ceiling Plates.
18. Blow off and Supply Valves.
19. Blow off Tanks.
20. Brickwork for Boiler setting.
21. Foundations.
22. Return Trap.
23. Condensation Return Trap.
24. Vacuum Pump.
25. Temperature Control.
26. Heater Coils.
27. Fan and Motor.
28. Registers, Galvanized Iron and Tin Work.
29. Wiring, etc.
30. Painting and Decorating.
31. Temporary Heat.
32. Radiator Shields.
33. Carting and Setting Boiler.
34. Smoke Pipe.
35. Local Cartage and Freight.
36. Board and Railway Fares.
37. Incidentals.

BRANCH TEES OR HEADERS

Branch Tees for Box Coils are always tapped left hand in branches and right hand in back inlet.

The run and back opening of Branch Tees are tapped the same size as branches, unless otherwise ordered.

No. of Branches	1 IN. BRANCH TEES			1¼" BRANCH TEES			1½" BRANCH TEES			2" BRANCH TEES		
	2½ in. Centre to Centre			3 in. Centre to Centre			3½ in. Centre to Centre			4½ in. Centre to Centre		
	1" or 1¼ in Run	1½ in Run	2 in. Run	1¼ in. or 1½ Run	2 in. Run	2½ in Run	1½ in or 2" Run	2½ in. Run	3 in. Run	2 in. Run	2½ in. or 3" Run	3½ in. Run
2	.90	1.00	1.15									
3	1.05	1.15	1.35	1.65	1.90	2.40	2.70	3 45	3.80	5 25	5.75	6.25
4	1.15	1.30	1.60	2.00	2.40	2.85	3.35	4.15	4.60	6.40	7.00	7.75
5	1.35	1.45	1.85	2.40	2.90	3.55	4.00	5.00	5 50	7.65	8.50	9.25
6	1.60	1.75	2.10	2.80	3.30	3.95	4.65	5.75	6.25	8.80	9 75	10 75
7	1.90	2.20	2.45	3.20	3.90	4.20	5.25	6.50	7.25	10.60	11.75	13 00
8	2.20	2 45	2.75	3.60	4 50	4.95	5.85	7.00	7.75	11.50	12.75	14.00
9	2.65	2.90	3.40	4.30	5.25	6.15	6.50	8.25	9.00	12.25	13.50	15.00
10		3.30	4.00	4.80	5.85	6.85	7.60	9.25	10.00	13.50	15 00	16.50
11		4.50	4.80	5 00	6.25	7.25	8 00	9.75	10.75			
12		4.75	5.10	5.25	6.50	7.65	8.50	10.50	11.40			
13		5 50	6.00	6.00	7.00	8 25						
14		7.00	7.25	6.75	7.75	9 00						
15		7.50	7.75	7.50	8.50	9 75						
16		8.00	8.25	8.50	9.50	10.75						

NOTE:—1 inch Branch Tees, 1 inch or 1¼ inch run, are 1¾ inches inside diameter.

1 inch Branch Tees, 1½ inch or two inch run, are 2¼ inches inside diameter.

1¼ inch Branch Tees are all 2½ inches inside diameter.

1½ inch Branch Tees are all 2¾ inches inside diameter

2 inch Branch Tees are all 3½ inches inside diameter.

Always order Branch Tees by size and number.

Above prices are for end outlets only, back or side outlets charged as additional front outlets.

CAST IRON HOOK AND RING PLATES

NUMBER OF BRANCHES	1	2	3	4	5	6	7	8	9	10	11	12
HOOK PLATES	c.	c.	c.	c.	$ c.	$ c.	$ c.	$ c	$ c.	$ c	$ c.	$ c.
1" pipe, 2½ " centre to centre	09	18	23	26	32	38	48	59	65	75	85	1 00
1¼ " 3 " "	10	21	27	32	41	52	68	80	90	1 00	1 35	1 40
1½ " 3½ " "	15	28	43	58	72	88	1 10	1 25	1 40	1 55	1 65	1 90
2 " 4½ " "	22	43	65	90	1 15	1 35	....	....	....	....	....	....
RING PLATES												
1 in. pipe, 2½" centre to centre	16	28	41	50	62	72	96	1 00	....	....	....	....
1¼ " 3 " "	21	35	5	62	75	1 10	1 25	1 40	....	....		

CUTTING PIPE TO LENGTH "EXTRA"

PRICE LIST

Lengths 6 ft. and under 16 ft.			2 ft. and under 6 ft.		1 ft. and under 2 ft.	
Size	Black	Galv'd	Black	Galv'd	Black	Galv'd
¼" & ⅜"	$ 0.60	$ 0.90	$ 0.80	$ 1.20	$ 1.00	$ 1.50
½"	.80	1.00	1.10	1.30	1.30	1.70
¾"	1.20	1.30	1.50	1.70	1.90	2.10
1"	1.40	1.90	2.00	2.50	2.40	3.20
1¼"	2.00	2.60	2.60	3.40	3.30	4.30
1½"	2.40	3.10	3.20	4.10	3.90	5.10
2"	3.20	4.10	4.20	5.50	5.30	6.90
2½"	5.10	6.60	6.80	8.80	8.50	11.00
3"	6.70	8.60	8.90	11.50	11.10	14.40
3½"	8.30	10.60	11.00	14.20	13.80	17.70
4"	9.80	12.60	13.10	16.80	16.30	21.00
4½"	11.50	15.00	15.50	20.00	19.50	25.00
5"	13.50	17.50	18.00	23.50	22.50	29.50
6"	17.50	23.00	23.50	30.50	29.00	38.00
7"	23.00	29.50	31.00	39.50	38.50	49.50
8"	28.00	36.00	37.00	48.00	47.00	60.00

PRICE LIST—THREADS ONLY

Size.....	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Threads, ea.	.06	.06	.06	.06	.06	.06	.08	.10	.14	.20	.30
Size.....	3½	4	4½	5	6	7	8	9	10	11	12
Threads, ea.	.40	.40	.50	.60	.90	1.10	1.20	2.00	2.50	3.50	3.50

Cuts—two-thirds of above price. Add 50 per cent. for left hand threads.

CAST IRON COMPANION FLANGES
PRICE LIST

Standard
For Working Pressure up to 125 lbs.

Size Inches	Threaded		Blind		Reducing	
	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each
1 x 4	$0 55	$0 80	.....	.....	.....	.....
1¼ x 4½	60	85	.....	.....	.....	.....
1½ x 5	65	90	.....	.....	.....	.....
2 x 6	75	1 00	1 15	1 40	1 30	1 55
2½ x 7	85	1 10	1 30	1 55	1 45	1 70
3 x 7½	95	1 25	1 40	1 70	1 55	1 85
3½ x 8½	1 20	1 55	1 80	2 15	2 00	2 35
4 x 9	1 35	1 80	2 00	2 45	2 20	2 65
4½ x 9¼	1 45	1 90	2 20	2 65	2 40	2 85
5 x10	1 60	2 05	2 40	2 85	2 65	3 10
6 x11	2 00	2 50	3 00	3 50	3 30	3 80
7 x12½	2 65	3 25	4 00	4 60	4 40	5 00
8 x13½	3 10	3 80	4 60	5 30	5 10	5 80
9 x15	3 85	4 65	5 75	6 55	6 35	7 15
10 x16	4 50	5 50	6 75	7 75	7 45	8 45
12 x19	6 50	7 65	9 75	10 90	10 75	11 90
14 x21	9 00	10 35	13 50	14 85	15 00	16 35
15 x22¼	11 50	13 20	17 00	18 70	19 00	20 70
16 x23½	13 50	15 30	20 00	21 80	22 00	23 80
18 x25	16 00	18 00	24 00	26 00	26 50	28 50
20 x27½	19 00	21 50	28 00	30 50	31 00	33 50
22 x29½	22 00	25 00	33 00	36 00	36 00	39 00
24 x32	27 00	30 50	40 00	43 50	44 00	47 50

All reducing flanges of same outside diameter take same prices.

Extra Heavy
For Working Pressure up to 250 lbs.

Size Inches	Threaded		Blind		Reducing	
	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each
1 x 4½	$0 95	$1 30	.....	.....	.....	.....
1¼ x 5	1 00	1 35	.....	.....	.....	.....
1½ x6	1 10	1 45	1 65	2 00	1 80	2 15
2 x 6½	1 25	1 60	1 90	2 25	2 10	2 45
2½ x 7½	1 40	1 75	2 10	2 45	2 30	2 65
3 x 8¼	1 60	2 05	2 40	2 85	2 65	3 10
3½ x 9	2 00	2 55	3 00	3 55	3 30	3 85
4 x10	2 25	2 95	3 35	4 05	3 70	4 40
4½ x10½	2 40	3 10	3 60	4 30	4 00	4 70
5 x11	2 65	3 35	4 00	4 70	4 40	5 10
6 x12½	3 30	4 05	5 00	5 75	5 50	6 25
7 x14	4 40	5 30	6 60	7 50	7 25	8 15
8 x15	5 10	6 15	7 65	8 70	8 40	9 45
9 x16¼	6 30	7 50	9 50	10 70	10 50	11 70
10 x17½	7 40	8 90	11 00	12 50	12 00	13 50
12 x20½	10 75	12 50	16 00	17 75	17 50	19 25
14 x23	15 00	17 00	22 50	24 50	25 00	27 00
15 x24½	19 00	21 50	28 50	31 00	31 50	34 00
16 x25½	22 25	25 00	33 50	36 25	37 00	39 75
18 x28	26 00	29 00	39 00	42 00	43 00	46 00
20 x30½	31 00	35 00	46 00	50 00	51 00	55 00
22 x33	36 00	41 00	54 00	59 00	60 00	65 00
24 x36	45 00	50 00	67 00	72 00	74 00	79 00

All reducing flanges of same outside diameter take same prices.

FLOOR FLANGES

Sizes of Pipe.		3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6	7	8	9	10	12
		c.	c.	c.	c.	c.	c.	c.	c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
DIAMETER OF FLANGES, INCHES.	3 each	10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	3 1/2 "	....	15	15	....	....	...	....	....	....	....	....	....	....	....	....	....	....	....	....
	4 "	....	....	22	16	16	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	4 1/2 "	....	....	....	....	25	22	....	....	....	....	....	....	....	....	....	....	....	....	....
	5 "	....	....	30	30	30	30	....	....	....	....	....	....	....	....	....	....	....	....	...
	5 1/2 "	....	....	....	....	....	....	35	....	....	....	....	....	....	....	....	....	....	....	....
	6 "	...	....	...	42	40	40	42	42	....	....	...	....	....	....	....	....	....	....	....
	6 1/2 "	....	....	....	....	....	....	50	50	50	....	....	....	....	....	....	....	....	....	....
	7 "	....	....	....	....	....	....	62	62	62	....	....	....	....	....	....	....	....	....	....
	7 1/2 "	....	....	....	....	....	....	....	....	75	..	....	....	....	....	....	....	....	....	....
	8 "	....	..	....	....	....	....	90	90	90	90	90	..	....	....	....	....	....	....	....
	8 1/2 "	....	....	....	....	....	....	....	....	....	1 00	1 00	....	....	....	....	....	....	....	....
	9 "	....	....	....	....	....	....	....	....	1 15	1 15	1 15	1 15	....	....	....	....	....	....	....
	9 1/2 "	....	....	....	....	....	....	....	....	....	....	....	1 25	....	....	....	....	....	....	....
	10 "	..	..	....	.	....	....	....	....	....	1 50	1 50	1 50	1 50	1 50	....	....	..	....	....
	11 "	....	....	....	....	....	....	....	....	....	....	....	1 75	1 75	1 75	....	....	....	....	....
	12 "	....	...	....	....	....	....	....	....	....	....	....	....	2 20	2 20	2 20	....	....	....	....
	12 1/2 "	....	....	....	....	....	....	....	....	....	....	....	....	2 20	2 20	2 20	....	....	....	....
	13 "	...	....	....	....	....	....	....	.. .	....	....	....	....	....	2 80	2 80	2 80	....	....	....
	13 1/2 "	....	....	.	....	....	....	....	...	....	....	....	....	....	2 80	2 80	2 80	....	....	....
	14 "	....	....	....	....	....	....	....	....	....	....	....	....	....	3 25	3 25	3 25	....	....	....
	15 "	....	....	....	....	....	....	....	....	....	....	....	....	...	....	4 00	4 00	4 00	...	....
	16 "	....	....	....	....	....	....	....	....	....	....	....	....	...	....	...	5 00	5 00	5 00	....
	17 "	....	...	...	...	....	....	....	....	....	....	....	....	...	....	....	....	5 75	5 75	....
	18 "	....	....	....	....	....	....	....	....	....	....	....	..	....	....	....	....	....	7 00	7 00
	19 "	....	....	....	...	....	....	....	....	....	....	....	....	....	....	....	....	....	7 50	7 50
	20 "	....	...	....	....		...	....	....	....	....	....	...	....	..	...	...	...	....	8 50

TEMPLATES FOR DRILLING FLANGED VALVES AND FLANGED FITTINGS

Size Inches	Low Pressure and Standard						Extra Heavy					
	Diameter of Flanges	Thickn'ss of Flanges	Bolt Circle	Number of Bolts	Size of Bolts	Bolt Lengths	Diameter of Flanges	Thickn'ss of Flanges	Bolt Circle	Number of Bolts	Size of Bolts	Bolt Lengths
1	4	7/16	3	4	7/16	1 1/2	4 1/2	11/16	3 1/4	4	1/2	2
1 1/4	4 1/2	1/2	3 3/8	4	7/16	1 1/2	5	3/4	3 3/4	4	1/2	2 1/4
1 1/2	5	9/16	3 7/8	4	1/2	1 3/4	6	13/16	4 1/2	4	5/8	2 1/2
2	6	5/8	4 3/4	4	5/8	2	6 1/2	7/8	5	4	5/8	2 1/2
2 1/2	7	11/16	5 1/2	4	5/8	2 1/4	7 1/2	1	5 7/8	4	3/4	3
3	7 1/2	3/4	6	4	5/8	2 1/2	8 1/4	1 1/8	6 5/8	8	3/4	3 1/4
3 1/2	8 1/2	13/16	7	4	5/8	2 1/2	9	1 3/16	7 1/4	8	3/4	3 1/4
4	9	15/16	7 1/2	8	5/8	2 3/4	10	1 1/4	7 7/8	8	3/4	3 1/2
4 1/2	9 1/4	15/16	7 3/4	8	3/4	3	10 1/2	1 5/16	8 1/2	8	3/4	3 1/2
5	10	15/16	8 1/2	8	3/4	3	11	1 3/8	9 1/4	8	3/4	3 3/4
6	11	1	9 1/2	8	3/4	3	12 1/2	1 7/16	10 5/8	12	3/4	3 3/4
7	12 1/2	1 1/16	10 3/4	8	3/4	3	14	1 1/2	11 7/8	12	7/8	4
8	13 1/2	1 1/8	11 3/4	8	3/4	3 1/4	15	1 5/8	13	12	7/8	4 1/4
9	15	1 1/8	13 1/4	12	3/4	3 1/4	16 1/4	1 3/4	14	12	1	4 3/4
10	16	1 3/16	14 1/4	12	7/8	3 1/2	17 1/2	1 7/8	15 1/4	16	1	5
12	19	1 1/4	17	12	7/8	3 3/4	20	2	17 3/4	16	1	5 1/4
14	21	1 3/8	18 3/4	12	1	4 1/4	22 1/2	2 1/8	20	20	1	5 1/2
15	22 1/4	1 3/8	20	16	1	4 1/4	33 1/2	2 3/16	21	20	1 1/8	5 3/4
16	23 1/2	1 7/16	21 1/4	16	1	4 1/4	25	2 1/4	22 1/2	20	1 1/8	6

Effective October 1, 1912.

CAST IRON FLANGED FITTINGS

For Working Pressure up to 125 lbs. **Standard**

PRICE LIST

Size Inches	Elbows, 90°		Elbows, 45°		Elbows, Reducing		Elbows, Long Radius		Elbows, With Base		Facing and Drilling Base Flange each
	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	
1¼	$ 3 00	$ 3 60	$ 3 30	$ 3 90	.....	.....	.....	.....	.....	.....	.....
1½	3 00	3 60	3 30	3 90	.....	.....	.....	.....	.....	.....	.....
2	3 00	3 60	3 30	3 90	.....	.....	5 00	5 90	.....	.....	.....
2½	3 15	3 75	3 50	4 10	.....	.....	5 25	6 15	.....	.....	.....
3	3 45	4 15	3 80	4 50	6 90	7 60	5 75	6 85	.....	.....	.....
3½	4 05	4 90	4 50	5 35	8 10	8 95	6 75	8 00	.....	.....	.....
4	4 50	5 50	5 00	6 00	9 00	10 00	7 50	9 00	9 00	10 00	3 00
4½	5 50	6 50	6 00	7 00	11 00	12 00	9 25	10 75	11 00	12 00	3 00
5	6 25	7 25	6 90	7 90	12 50	13 50	10 50	12 00	12 50	13 50	3 50
6	7 60	8 90	8 35	9 65	15 25	16 55	12 65	14 60	15 25	16 55	3 50
7	10 50	12 00	11 00	12 50	21 00	22 50	17 50	19 75	21 00	22 50	3 50
8	12 00	13 60	12 60	14 20	24 00	25 60	20 00	22 40	24 00	25 60	5 00
9	17 00	19 25	17 75	20 00	34 00	36 25	28 50	31 85	34 00	36 25	5 00
10	19 00	21 70	20 00	22 70	38 00	40 70	31 50	35 50	38 00	40 70	5 00
12	28 00	31 00	29 50	32 50	56 00	59 00	46 50	51 00	56 00	59 00	7 50
14	41 50	45 25	41 50	45 25	70 00	73 75	69 00	74 50	70 00	73 75	7 50
15	47 00	51 50	47 00	51 50	80 00	84 50	78 00	84 75	80 00	84 50	7 50
16	54 50	59 50	54 50	59 50	90 00	95 00	91 00	98 50	90 00	95 00	7 50
18	71 00	77 00	71 00	77 00	105 00	111 00	118 00	127 00	105 00	111 00	12 00
20	90 00	97 00	90 00	97 00	120 00	127 50	150 00	160 00	120 00	127 00	12 00
22	113 00	122 00	113 00	122 00	150 00	159 00	189 00	202 00	150 00	159 00	12 00
24	140 00	150 00	140 00	150 00	190 00	200 00	233 00	248 00	190 00	200 00	12 00

Standard Flanged Taper Reducers, also Special Fittings are made to order. Prices on application.

Sizes not listed will be charged as specials. When ordering reducing flanged fittings always state whether they may be reduced by a flange if the regular fittings are not in stock.

CAST IRON FLANGED FITTINGS

For Working Pressure up to 125 lbs. **Standard**

PRICE LIST

Size Ins.	TEES				CROSSES				LATERALS			
	Straight		Reducing		Straight		Reducing		Straight		Reducing	
	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each
1¼	$4 35	$ 5 25	.....	.....	$ 6 75	$ 7 95	.....	.....	$ 6 75	$ 7 95	.....	.....
1½	4 35	5 25	5 00	5 90	6 75	7 95	.....	.....	6 75	7 95	.....	.....
2	4 35	5 25	5 00	5 90	6 75	7 95	7 75	8 95	6 75	7 95	7 75	8 95
2½	4 55	5 45	5 25	6 15	6 95	8 15	8 00	9 20	6 95	8 15	8 00	9 20
3	5 00	6 10	5 75	6 85	7 65	9 05	8 75	10 15	7 65	9 05	8 75	10 15
3½	5 85	7 10	6 75	8 00	9 00	10 70	10 35	12 05	9 00	10 70	10 35	12 05
4	6 50	8 00	7 50	9 00	10 00	12 00	11 50	13 50	10 00	12 00	11 50	13 50
4½	8 00	9 50	9 25	10 75	12 00	14 00	13 75	15 75	12 00	14 00	13 75	15 75
5	9 10	10 60	10 50	12 00	13 75	15 75	15 75	17 75	13 75	15 75	15 75	17 75
6	11 00	12 95	12 65	14 60	16 75	19 25	19 25	21 75	16 75	19 25	19 25	21 75
7	15 25	17 50	17 50	19 75	23 00	26 00	26 50	29 50	23 00	26 00	26 50	29 50
8	17 40	19 80	20 00	22 40	26 50	29 75	30 50	33 75	26 50	29 75	30 50	33 75
9	24 65	28 00	28 50	31 85	37 50	42 00	43 00	47 50	37 50	42 00	43 00	47 50
10	27 50	31 50	31 50	35 50	42 00	47 50	48 00	53 50	42 00	47 50	48 00	53 50
12	40 50	45 00	46 50	51 00	61 50	67 50	71 00	77 00	61 50	67 50	71 00	77 00
14	60 00	65 50	69 00	74 50	91 00	98 50	105 00	112 50	91 00	98 50	105 00	112 50
15	68 00	74 75	78 00	84 75	103 00	112 00	118 00	127 00	103 00	112 00	118 00	127 00
16	79 00	86 50	91 00	98 50	120 00	130 00	138 00	148 00	120 00	130 00	138 00	148 00
18	103 00	112 00	118 00	127 00	157 00	169 00	180 00	192 00	157 00	169 00	180 00	192 00
20	130 00	140 00	150 00	160 00	198 00	212 00	228 00	242 00	198 00	212 00	228 00	242 00
22	164 00	177 00	189 00	202 00	248 00	266 00	285 00	303 00	248 00	266 00	285 00	303 00
24	203 00	218 00	233 00	248 00	310 00	330 00	355 00	375 00	310 00	330 00	355 00	375 00

Standard Flanged Taper Reducers, also Special Fittings are made to order. Prices on application.

Sizes not listed will be charged as specials. When ordering reducing flanged fittings always state whether they may be reduced by a flange if the regular fittings are not in stock.

CAST IRON FLANGED FITTINGS

For Working Pressure up to 250 lbs. **Extra Heavy**

PRICE LIST

Size Inches	Elbows, 90°		Elbows, 45°		Elbows, Reducing		Elbows, Long Radius		Elbows, With Base		Facing and Drilling Base Flange each
	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	
1¼	$ 4 50	$ 5 40	$ 5 00	$ 5 90	.....	.....	.....	.....	.....	.....	.....
1½	4 50	5 40	5 00	5 90	.....	.....	.....	.....	.....	.....	.....
2	4 50	5 40	5 00	5 90	9 00	9 90	7 50	8 85	9 00	9 90	.....
2½	4 75	5 65	5 25	6 15	9 50	10 40	8 00	9 35	9 50	10 40	.....
3	5 15	6 25	5 65	6 75	10 25	11 35	8 60	10 25	10 25	11 35	.....
3½	6 10	7 35	6 75	8 00	12 25	13 50	10 25	12 15	12 25	13 50	.....
4	6 75	8 25	7 50	9 00	13 50	15 00	11 25	13 50	13 50	15 00	4 50
4½	8 25	9 75	9 00	10 50	16 50	18 00	13 75	16 00	16 50	18 00	4 50
5	9 35	10 85	10 35	11 85	18 75	20 25	15 50	17 75	18 75	20 25	5 25
6	11 40	13 40	12 50	14 50	22 75	24 75	19 00	22 00	22 75	24 75	5 25
7	15 75	18 00	16 50	18 75	31 50	33 75	26 50	29 85	31 50	33 75	5 25
8	18 00	20 50	19 00	21 50	36 00	38 50	30 00	33 75	36 00	38 50	7 50
9	25 50	28 85	26 75	30 10	51 00	54 35	42 50	47 50	51 00	54 35	7 50
10	28 50	32 50	30 00	34 00	57 00	61 00	47 75	53 75	57 00	61 00	7 50
12	42 00	46 50	44 00	48 50	84 00	88 50	70 00	76 75	84 00	88 50	11 00
14	62 00	67 50	62 00	67 50	105 00	110 50	103 50	111 75	105 00	110 50	11 00
15	70 00	77 00	70 00	77 00	120 00	127 00	117 00	127 00	120 00	127 00	11 00
16	82 00	90 00	82 00	90 00	135 00	143 00	137 00	149 00	135 00	143 00	11 00
18	106 00	115 00	106 00	115 00	157 00	166 00	177 00	191 00	157 00	166 00	18 00
20	135 00	145 00	135 00	145 00	180 00	190 00	225 00	240 00	180 00	190 00	18 00
22	170 00	183 00	170 00	183 00	225 00	238 00	285 00	305 00	225 00	238 00	18 00
24	210 00	225 00	210 00	225 00	285 00	300 00	350 00	373 00	285 00	300 00	18 00

Sizes not listed will be charged at special discount.

When ordering reducing flanged fittings always state whether they may be reduced by a flange if the regular fittings are not in stock.

CAST IRON FLANGED FITTINGS

For Working Pressure up to 250 lbs. **Extra Heavy**

PRICE LIST

Size Ins.	TEES				CROSSES				LATERALS			
	Straight		Reducing		Straight		Reducing		Straight		Reducing	
	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each	Faced each	Faced and Drilled each
1¼	$ 6 50	$ 7 85	.....	.....	$10 00	$11 80	.....	.....	$10 00	$11 80	.....	.....
1½	6 50	7 85	7 50	8 85	10 00	11 80	.....	.....	10 00	11 80	.....	.....
2	6 50	7 85	7 50	8 85	10 00	11 80	11 50	13 30	10 00	11 80	11 50	13 30
2½	6 90	8 25	8 00	9 35	10 50	12 30	12 00	13 80	10 50	12 30	12 00	13 80
3	7 50	9 15	8 60	10 25	11 50	13 75	13 25	15 50	11 50	13 75	13 25	15 50
3½	8 90	10 80	10 25	12 15	13 50	16 00	15 50	18 00	13 50	16 00	15 50	18 00
4	9 75	12 00	11 25	13 50	15 00	18 00	17 00	20 00	15 00	18 00	17 00	20 00
4½	12 00	14 25	13 75	16 00	18 00	21 00	21 00	24 00	18 00	21 00	21 00	24 00
5	13 50	15 75	15 50	17 75	20 50	23 50	23 50	26 50	20 50	23 50	23 50	26 50
6	16 50	19 50	19 00	22 00	25 00	29 00	29 00	33 00	25 00	29 00	29 00	33 00
7	23 00	26 35	26 50	29 85	35 00	39 50	40 00	44 50	35 00	39 50	40 00	44 50
8	26 00	29 75	30 00	33 75	40 00	45 00	46 00	51 00	40 00	45 00	46 00	51 00
9	37 00	42 00	42 50	47 50	56 00	62 75	65 00	71 75	56 00	62 75	65 00	71 75
10	41 50	47 50	47 75	53 75	63 00	71 00	72 00	80 00	63 00	71 00	72 00	80 00
12	61 00	67 75	70 00	76 75	92 00	101 00	103 00	115 00	92 00	101 00	106 00	115 00
14	90 00	98 25	103 50	111 75	136 00	147 00	158 00	169 00	136 00	147 00	158 00	169 00
15	102 00	112 00	117 00	127 00	155 00	169 00	177 00	191 00	155 00	169 00	177 00	191 00
16	119 00	131 00	137 00	149 00	180 00	196 00	207 00	223 00	180 00	196 00	207 00	223 00
18	154 00	168 00	177 00	191 00	235 00	253 00	270 00	288 00	235 00	253 00	270 00	288 00
20	195 00	210 00	225 00	240 00	300 00	320 00	345 00	365 00	300 00	320 00	345 00	365 00
22	247 00	267 00	285 00	305 00	375 00	401 00	430 00	456 00	375 00	401 00	430 00	456 00
24	305 00	328 00	350 00	373 00	465 00	495 00	535 00	565 00	465 00	495 00	535 00	565 00

Extra Heavy Flanged Taper Reducers, also special Fittings are made to order. Prices on application

NOTE

Refer to the following pages for information:

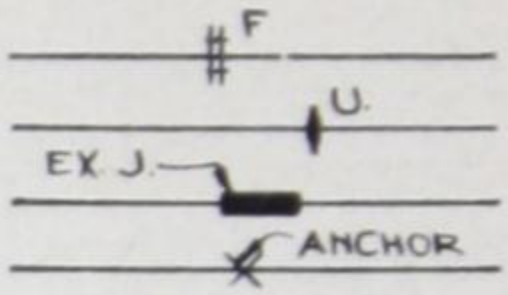
HOW TO READ BLUE PRINTS
STANDARD SYMBOLS

FLANGES (BOLTED)

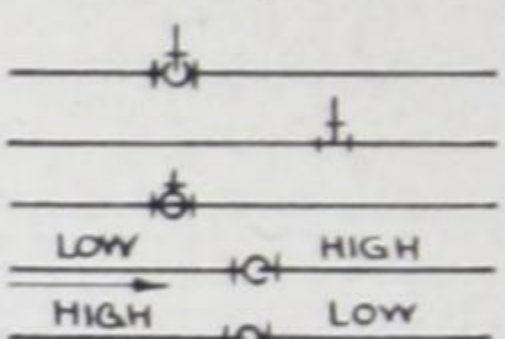
UNIONS (SCREWED)

EXPANSION JOINT

ANCHOR

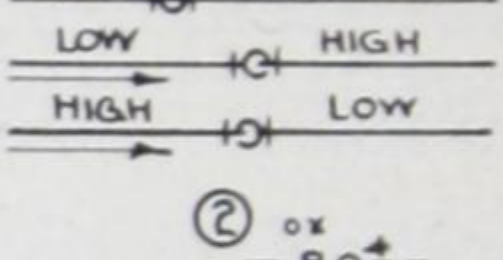


CONNECTIONS TO MAINS
- FROM TOP
- FROM SIDE
- FROM BOTTOM



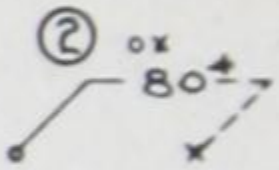
RISE IN MAIN

DROP IN MAIN



RISER AND RISER NUMBER

1ST FLOOR RADIATOR CONNECTION



GATE VALVE

ANGLE VALVE

GLOBE VALVE

SWING CHECK VALVE

DIAPHRAGM VALVE

AIR LINE VALVE

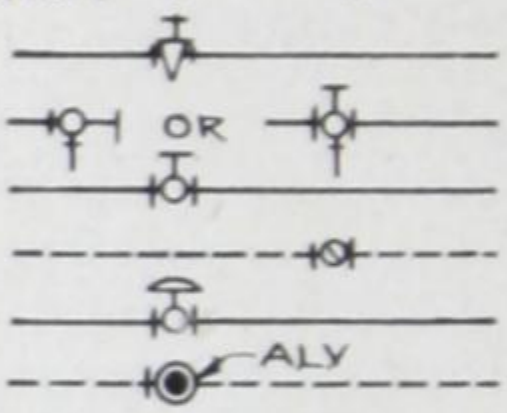
LOW PRESSURE TRAP

HIGH PRESSURE TRAP

AIR VENT OR AIR ELIMINATOR

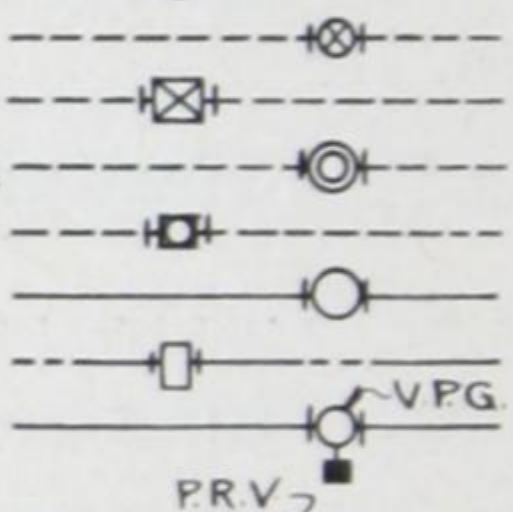
SUCTION STRAINER

STEAM SEPARATOR

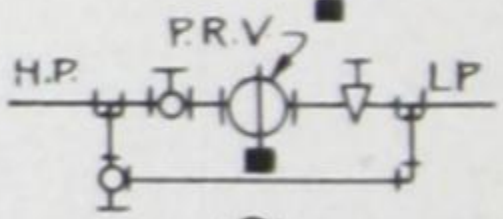


OIL SEPARATOR

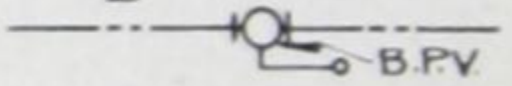
VACUUM PUMP GOVERNOR



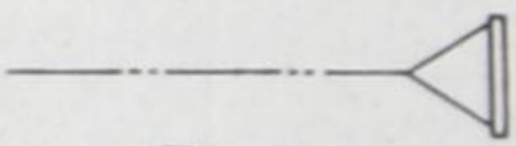
PRESSURE REDUCING VALVE



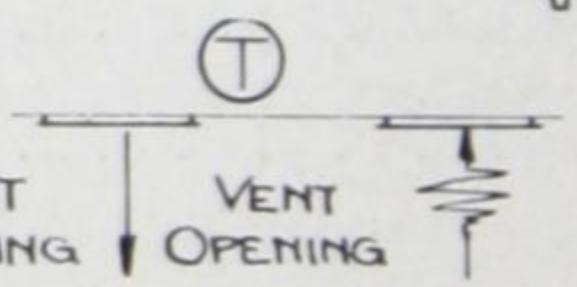
BACK PRESSURE VALVE



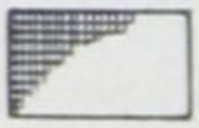
EXHAUST HEAD



THERMOSTAT



FLOOR REGISTER



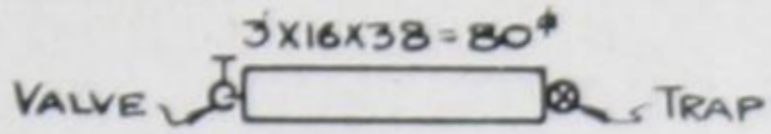
HEAT OPENING

VENT OPENING

HOW TO READ BLUE PRINTS—Continued

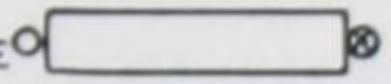
STANDARD SYMBOLS

NEW RADIATOR

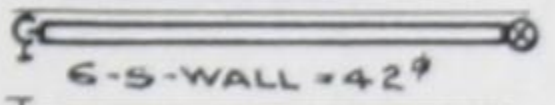


OLD RADIATOR

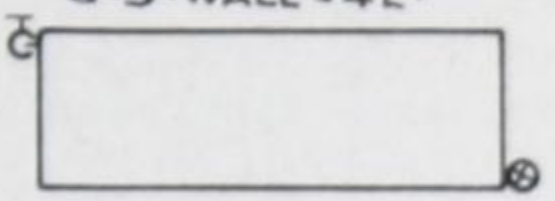
RADIATOR WITH DIAPHRAGM VALVE



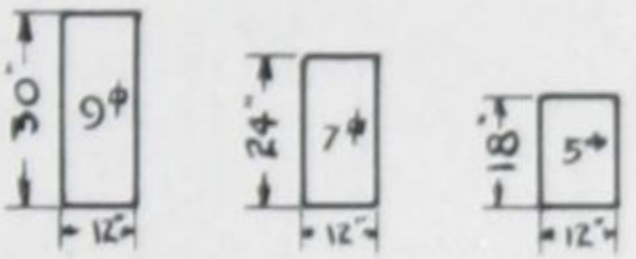
WALL RADIATOR ON WALL



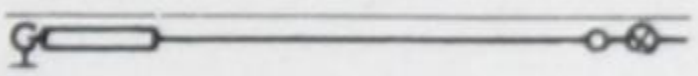
WALL RADIATOR ON CEILING



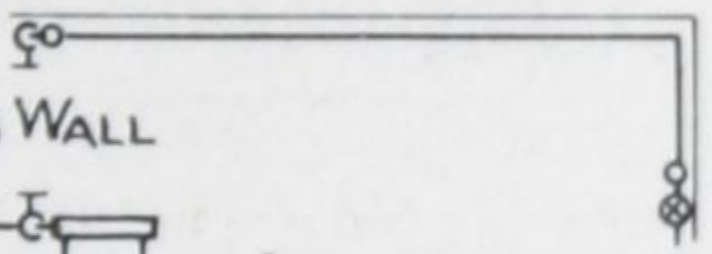
WALL RADIATION
APPROXIMATE SIZES



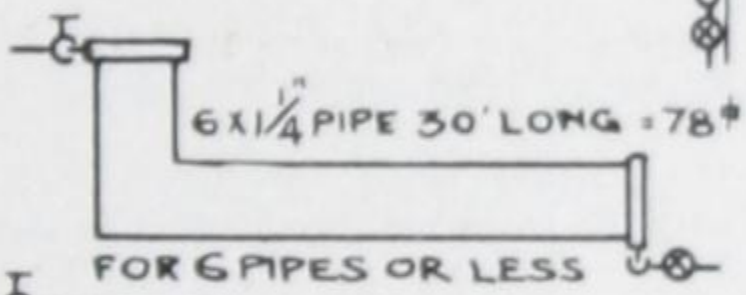
HARP PIPE COIL ON WALL



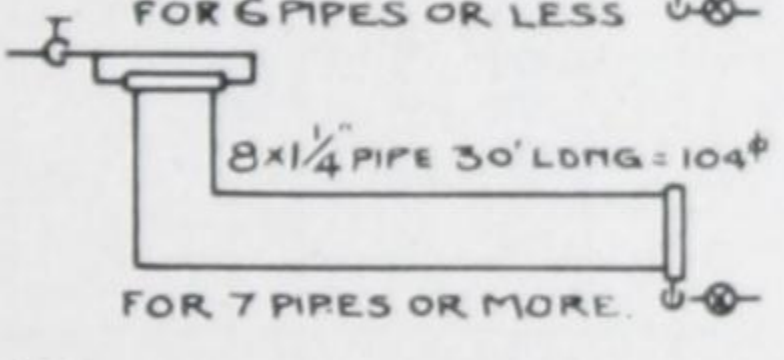
CORNER PIPE COIL ON WALL



HARP PIPE COIL
ON CEILING



HARP PIPE COIL
ON CEILING



LOW PRESSURE STEAM ——————————

HIGH PRESSURE STEAM —·—·—·—·—

EXHAUST STEAM —·—·—·—·—

OLD STEAM PIPE L.P. —·—·—·—·—

DRY RETURN PIPE – – – – – – –

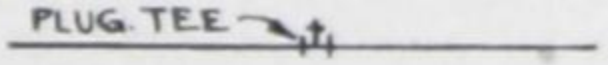
OLD RETURN PIPE ——————————

DRY DRIP PIPE — — — — — —

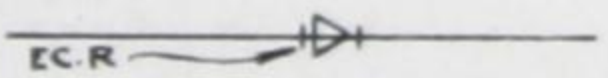
WET DRIP OR WET RETURN ———— ———— ————

OLD DRIP PIPE ———— ———— ————

PLUGGED TEE



ECCENTRIC REDUCER



LIST OF SIZES OF HOT WATER MAINS AND SQUARE FEET OF RADIATION

TABLE OF HOT WATER MAINS AND BRANCHES

Main			Branch									
1	in.	will supply	2	.....						¾	in.
1¼	in.	"	2	.....						1	in.
1½	in.	"	2	.....						1¼	in.
2	in.	"	2	.....						1½	in.
2½	in.	"	2	1½	in. and	1	1¼	in., or	1 2 in. and 1	1½	in.
3	in.	"	1	2½	in. and	1	2	in., or	2 2 in. and 1	1½	in.
3½	in.	"	2	2½	in. or	1	3	in., and	1 2 in. or 3	2	in.
4	in.	"	1	3½	in. and	1	2½	in., or	2 3 in. and 4	2	in.
4½	in.	"	1	3½	in. and	1	3	in., or	1 4 in. and 1	2½	in.
5	in.	"	1	4	in. and	1	3	in., or	1 4½ in. and 1	2½	in.
6	in.	"	2	4	in. and	1	3	in., or	4 3 in. or 10	2	in.
7	in.	"	1	6	in. and	1	4	in., or	3 4 in. and 1	2	in.
8	in.	"	2	6	in. and	1	5	in., or	5 4 in. and 2	2	in.

TABLE OF HOT WATER RISERS

Size of Riser.	1st Floor.	2nd Floor.	3rd Floor.	4th Floor.	5th Floor.	6th Floor.
1 in.	48 sq. ft.	55 sq. ft.	65 sq. ft.	75 sq. ft.	85 sq. ft	95 sq. ft.
1¼ in.	60 "	90 "	110 "	125 "	140 "	160 "
1½ in.	100 "	140 "	165 "	185 "	210 "	240 "
2 in.	200 "	275 "	375 "	425 "	500 "	
2½ in.	350 "	475 "				
3 in.	550 "					
3½ in.	850 "					

HOT WATER RADIATION AND SIZES OF PIPE

Sizes of Pipe, in.		1	1¼	1½	2	2½	3	3½	4	4½	5	6
Length of main.	100	30	60	100	200	350	550	850	1,200			
	200		50	75	150	250	400	600	850	1,200	1.400	
	300			50	125	200	300	450	700	950	1,150	
	400				100	175	275	400	600		1,000	1,600

LIST OF SIZES OF STEAM MAINS AND SQUARE FEET OF RADIATION

CAPACITY OF STEAM RISERS (ONE PIPE)

Size, Inches	¾	1¼	1½	2	2½	3	3½	4
Capacity Up Feed	30	90	120	200	300	450	620	800
Capacity Down Feed	60	110	160	260	400	600	800	1000

In high buildings with the down feed system, the lower half of the Riser should be based on not more than half the capacities shown in down feed or lower column to provide for the condensation in upper Radiator.

CAPACITY OF STEAM RISERS (TWO PIPE)

Size of Supply Inches	1	1¼	1½	2	2½	3	3½	4
Capacity Up Feed	50	100	150	270	470	840	1200	1600
Capacity Down Feed	55	115	175	325	570	1000	1480	2000
Size Return Riser	¾	1	1–1¼	1–1¼	1¼–1½	1¼–1½	1½–2	1½–2

Over six stories use 10% less surface on Riser to allow for increased condensation.

SIZE OF STEAM MAINS (TWO PIPE) FOR MAINS NOT EXCEEDING 100 FEET IN LENGTH

Size of Supply	1	1¼	1½	2	2½	3	3½	4	4½	5	6	7	8
Capacity Direct Radiation	55	115	175	325	570	1000	1480	2000	2770	3500	5700	8800	12000
Diam. Dry Return	¾	1	1¼	1¼	1½	2	2½	3	3	3½–4	4–5	4–5	4–5
Diam. Wet Return	¾	1	1¼	1¼	1½	2	2½	2½	2½	3	3½–4	4	

SIZE OF ONE PIPE STEAM CIRCUIT MAIN (FOR MAINS OF ORDINARY LENGTH NOT EXCEEDING 100 FEET)

Diam. of Main	2	2½	3	3½	4	4½	5	6	7	8	9	10
Capacity Direct Radiation	200	350	600	900	1200	1700	2100	3000	4500	5800	7500	9500

PROPORTIONING RADIATION

HEAT TRANSMISSION RULE

(For figuring radiation for heating by water or steam, to maintain 70 degrees inside)

	Different degrees of outside temperature:				
	20 above zero	10 above zero	Zero	10 below zero	20 below zero
For ½ air change per hour multiply the cubic contents by.....	.5	.6	.7	.8	.9
For 1 air change per hour multiply the cubic contents by.....	1.0	1.2	1.4	1.6	1.8
For 1½ air change per hour multiply the cubic contents by.....	1.5	1.8	.21.	2.4	2.7
For 2 air changes per hour multiply the cubic contents by.....	2.0	2.4	2.8	3.2	.36
Multiply the exposed glass by...	50	65	75	85	95
Multiply the exposed wall by....	17	20	25	27	30

Use the co-efficient for ½ air change for rooms only requiring tempering.
" " " 1 " " " bedrooms.
" " " 1½ " " " living rooms.
" " " 2 " " " halls, bath and exposed rooms.

Add the results thus obtained and divide by 160, and the result will be the square feet of direct Hot Water radiation required to heat the room.

Add the results thus obtained and divide by 250, and the result will be the square feet of direct Steam radiation required to heat the room.

CARPENTER'S RULE

RULES FOR PROPORTIONING RADIATION

Professor R. C. Carpenter, of Cornell University, submits the following rule for determining the size of radiator needed for a given room.

RULE:—Add the area of the glass surface in the room to one-quarter of the exposed wall surface, and to this add from 1-55 to 3-55 of the cubical contents (1-55 for rooms on upper floor, 2-55 for rooms on first and 3-55 for large halls); then for steam multiply by .25 and for water .40.

EXAMPLE:—A room 20x12x10 feet, with glass exposure of 48 feet, ¼ of wall exposure, (two sides exposed) 320 feet =80, 1-55 of 2400—44.

48 +80 +44 =172 x .25 =43 feet

If you add 2-55 the surface would be 54 feet.
If you add 3-55 the surface would be 65 feet.

MILLS' RULE

(Quick Method—Not as Reliable)

A very popular and easily remembered formula is the well known Mills' 2-20-200 Rule (Western Canada 2-10-200), in which the total amount of steam radiation required is obtained as follows:—

$$\frac{\text{Glass}}{2} + \frac{\text{Ex. wall}}{20} + \frac{\text{Cu. contents}}{200} = \text{sq. ft. of radiation.}$$

NOTE:—This rule does not work out well in the case of halls or rooms having less than ordinary amounts of wall and glass surface, where the opening and closing of outside doors changes the air frequently. In such cases the radiation should be increased 20% or over.

HANGING INDIRECT STACKS

For cleanliness, as well as for obtaining the best results, Indirect stacks should be hung on one side of the register or warm air flue opening, receiving the warm air duct from the end of the indirect casing close to the top, and the cold air duct at the bottom of the opposite end. A space of ten inches (preferably twelve) should be allowed for warm air above the Stack, and ten inches below for cold air.

STEAM OR WATER INDIRECT

Square feet in stack.....	50	60	70	80	90	100
Cold Air Duct, first floor, sq. in. in area.....	60	70	80	90	100	110
Cold Air Duct, upper floors, sq. in. in area.....	50	60	70	80	90	100
Warm Air Duct, first floor, sq. in. in area.....	90	100	115	130	145	160
Warm Air Duct, upper floors, sq. in. in area.....	60	70	80	90	100	110
Rectangular Registers, first floor.....	10x14	12x15	12x15	12x19	16x20	16x22
Rectangular Registers, upper floors.....	8x10	9x12	10x14	12x15	12x19	12x19

INDIRECT HEATING

Table for quick calculation of pipes and areas for indirect heating for moderate size of Steam or Water-Heating Plants.

Dimensions of Pipe	Area in Square Inches	Size of Register Required
8 inches.....	50	8 x 12
9 "	63	9 x 14
10 "	78	10 x 16
12 "	113	14 x 16
14 "	154	16 x 20
16 "	201	18 x 24
18 "	254	20 x 26
20 "	314	24 x 27
22 "	380	24 x 32
24 "	452	30 x 30

Quoted from Standard Authorities. Not Guaranteed

SYSTEM OF PROPORTIONING

WATER RADIATION BASED ON LOSS OF HEAT IN B.T.U.

Single Glass		Exposed Wall				Cubical Contents one change of air per hour	
Square Feet	Radiation	Square Feet	Radiation 8 in. or 9 in. Brick	Radiation 12 in. or 1st Class Frame	Radiation 16 in. Brick	Cubical Contents	Radiation
6	3	10	2	1	1	350	3
7	3	20	4	3	2	400	4
8	4	30	6	4	3	450	4
9	4	40	9	6	5	500	5
10	5	50	11	7	6	550	5
12	6	60	13	9	7	600	6
14	7	70	15	10	8	700	6
16	8	80	17	12	9	800	7
18	9	90	19	13	10	900	8
20	10	100	21	15	12	1000	9
22	10	110	24	16	13	1200	11
24	11	120	26	18	14	1400	13
26	12	130	28	19	15	1600	15
28	13	140	30	21	16	1800	16
30	14	150	32	22	17	2000	18
32	15	160	34	24	19	2200	20
34	16	170	36	25	20	2400	22
36	17	180	38	26	21	2600	24
38	18	190	41	28	23	2800	26
40	19	200	43	29	24	3000	28
42	20	220	47	32	26	3200	29
44	21	240	51	35	29	3400	31
46	22	260	56	38	31	3600	33
48	23	280	60	41	33	3800	35
50	24	300	64	44	35	4000	37
52	25	320	68	47	38	4200	39
54	26	340	73	50	40	4400	40
56	27	360	77	53	42	4600	42
58	28	380	81	56	45	4800	44
60	29	400	85	59	48	5000	46

For double glass (such as storm windows) deduct 50%.

For poorly constructed frame houses or 8 inch brick when plastered on brick, take double Radiation required for 12 inch brick wall.

For rooms with large open mantels or loose windows etc., use double amount required for one change of air per hour.

For windward or northern exposures add 10 to 15%.

The above is based on a difference of 70° between outside and inside temperatures for other temperatures allow 2% for each degree difference.

STEAM RADIATION, BASED ON LOSS OF HEAT IN B.T.U.

Single Glass.		Exposed Wall.				Cubical contents one change of air per hour.	
Square Feet.	Radiation.	Square Feet.	Radiation 8 or 9 in. brick.	Radiation 12 in. or 1st class frame.	Radiation 16 inch brick.	Cubical contents.	Radiation.
6	2	10	1	1	1	350	2
8	2	20	2	2	2	400	2
8	3	30	4	3	3	450	3
9	3	40	5	4	3	500	3
10	3	50	7	5	4	550	3
12	4	60	8	6	5	600	4
14	4	70	9	7	5	700	4
16	5	80	11	7	6	800	5
18	5	90	12	8	7	900	5
20	6	100	13	9	8	1,000	6
22	7	110	15	10	8	1,200	7
24	7	120	16	11	9	1,400	8
26	8	130	17	12	10	1.600	9
28	8	140	19	13	10	1 800	10
30	9	150	20	14	11	2.000	12
32	10	160	21	15	12	2 200	13
34	10	170	23	16	13	2,400	14
36	11	180	24	17	14	2,600	15
38	12	190	25	18	15	2.800	16
40	12	200	27	19	16	3,000	17
42	13	220	29	20	17	3,200	19
44	13	240	32	22	18	3,400	20
46	14	260	35	24	20	3,600	21
48	15	280	37	26	21	3,800	22
50	15	300	40	28	23	4,000	23
52	16	320	43	30	24	4,200	24
54	16	340	45	32	26	4,400	26
56	17	360	48	33	27	4,600	27
58	18	380	51	35	29	4,800	28
60	19	400	53	37	31	5,000	29

For double glass (such as storm windows) deduct 50 %.

For poorly-constructed frame houses or 8 inch brick when plastered on brick take double radiation required for 12 inch brick wall.

For rooms with large open mantels or loose windows, etc., use double amount required for one change of air per hour.

For windward or northern exposures add 10 to 15%.

The above is based on a difference of 70° between outside and inside temperatures. For other temperatures allow 2% for each degree difference.

HEATING GREENHOUSES AND CONSERVATORIES

The proposition being for a good construction of building without exceptional conditions, the following will be safe practice in the assignment of radiation to meet the exigencies of **zero** weather.

HOT WATER

To maintain Temperature of	40 to 50 Degrees	50 to 70 Degrees
One square foot of surface to	3½ to 4 sq. feet Glass	3 to 3½ sq. feet Glass

STEAM

To maintain Temperature of	40 to 50 Degrees	50 to 70 Degrees
One square foot of surface to	5½ to 6½ sq.feet Glass	4½ to 6 sq. feet Glass

Having found the amount of radiation required, select a boiler of large size—one or two sizes larger—not one that will just do the work. A larger body of coal, under slower combustion, holding always a large reserve power to meet sudden changes and emergencies, will be in the order of economy and a security to the best results.

A most important part of a greenhouse plant is the chimney; it should be of brick or tile of ample size and height, not less than 25 feet high. Sheet iron chimneys should not be tolerated.

CHIMNEY FLUES

Chimney flues should be of ample size and straight from near the cellar floor to above the highest projection of the roof. It should be absolutely independent and of sufficient area for passing sufficient air for the greatest consumption of fuel to be used. Less air will not do; more than is required will do no harm as it will be within the power of the draft regulator to lessen it. A well jointed tile flue, perfectly round, is better than a brick flue of equal area. A square brick flue is preferable to a rectangular one on account of the greater friction in the latter. Rectangular flues of extreme proportions, i.e., length to width, are very objectionable as they often induce local currents, up and down, which become a distraction.

Direct Radiation		Height of Chimney Flue					
Steam in Sq. Feet	Water in Sq. Feet	20 ft.	30 ft.	40 ft.	50 ft.	60 ft.	80 ft.
250	375	7.4	7.	6.7	6.4	6.2	6.
500	750	9.6	9.2	8.8	8.2	8.	6.6
750	1,150	11.3	10.8	10.2	9.6	9.3	8.8
1,000	1,500	12.8	12.	11.4	10.8	10.5	10.
1,500	2,250	15.2	14.4	13.4	12.8	12.4	11.5
2,000	3,000	17.2	16.3	15.2	14.5	14.	13.2
3,000	4,500	20.6	18.5	18.2	17.2	16.6	15.8
4,000	6,000	23.6	22.2	20.8	19.6	19.	17.8
5,000	7,500	26.	24.6	23.	21.6	21.	19.4
6,000	9,000	28.4	26.8	25.	23.4	22.8	21.2
7,000	10,500	30.4	28.8	27.	25.5	24.4	23.
8,000	12,000	32.4	30.6	28.6	26.8	26.	24.2
9,000	13,500	34.	32.4	30.4	28.4	27.4	25.6
10,000	15,000	37.	34.	32.	30.	28.6	27

A LESS SPECIFIC RULE FOR CHIMNEY FLUES

Herewith is a table of chimney flue sizes which is commonly used with good results. It does not take into consideration varying heights of stacks, but is said to be reliable in average conditions.

Direct Radiation*		Size of Flue	
Steam in Square Feet	Water in Square Feet	Round	Square
250	400	8	8 x 8
300	500	8	8 x 8
400	700	8	8 x 8
500	850	10	8 x 12
600	1,000	10	8 x 12
700	1,200	10	8 x 12
800	1,350	12	12 x 12
900	1,500	12	12 x 12
1,000	1,700	12	12 x 12
1,200	2,100	12	12 x 12
1,400	2,400	14	12 x 16
1,600	2,700	14	12 x 16
1,800	3,000	14	12 x 16
2,000	3,400	14	12 x 16
2,200	3,700	16	16 x 16
3,000	5,100	16	16 x 16
3,500	5,900	18	16 x 20
5,000	8,500	18	16 x 20

*Indirect radiation should be counted as 50 per cent. more than direct, and corresponding areas of flue should be provided therefor. The amount of radiation determines the requisite size or Boiler, and therefore area of flue.

NOTES ON CHIMNEYS

Chimneys which make a turn to go around a fire place, or which are offset from a vertical position will almost always prove defective, unless care is exercised to make the offset very smooth and the area of the chimneys larger than if flue be carried "straight up."

The chimney-top should run above the highest part of the roof at least four feet.

The chimney should be set on inside if possible. If set on outside walls the chimney breast should extend on the inside of the house in preference to extending outside. This is for the reason that the heat radiating from the chimney reduces the intensity of draft.

Short bends for offsets should be avoided.

Enlargement at base or increased cross sectional area of chimney should be avoided.

If the flue is made of brick, the outside walls should be at least 8 inches thick to insure safety. The inside joints should be well struck, each course should be well bedded and free from surface mortar at the joints. The exposed brick at the top of Chimney should be laid in cement mortar to prevent cutting out of the joints.

The boiler flue should have no other openings either above or below the boiler smoke pipe. Special care being exercised at the base of the flue to prevent any connection between it and the soot pocket of any other flue.

If a chimney contains more than one flue the dividing wall must be carried from the bottom to the top so that each flue is independent of the other throughout its entire length.

Long smoke pipes should be avoided wherever possible. When they are necessary, great care should be taken to see that joints are made tight, where the smoke pipe fits the smokehood and enters the chimney, the joints should be made tight with boiler putty or asbestos cement.

In case it is necessary to have a long smoke pipe from the heater to the chimney, great care is necessary to prevent loss of heat. Such a smoke pipe should be one or two inches larger than regular and should have an upward grade to chimney. It should have a good coating of asbestos covering, and there should be as few turns in the pipe as possible.

Smoke pipes should not extend into the flues beyond the inside surface of the lining, otherwise the end of the pipe cuts down the area of the flue.

CAPACITIES OF WROUGHT IRON PIPE

Inside Diameter, Inches.	1	1¼	1½	2	2½	3	3½	4	5	6
Length of pipe per square foot of external surface.....	2.9	2.3	2.0	1.6	1.32	1.09	0.95	0.84	0.68	0.57
Square feet surface per 1 lineal foot.....	0.34	0.43	0.50	0.62	0.75	0.92	1.05	1.18	1.46	1.74
Length of pipe necessary to contain 1 gallon of water....	22.3	12.8	9.4	5.7	4.02	2.6	1.95	1.51	.96	.62

PRESSURE OF WATER FOR EACH FOOT IN HEIGHT

Feet in Height.	Pounds per Square Inch.	Feet in Height.	Pounds per Square In.	Feet in Height.	Pounds per Square In.
1	.43	15	6.49	50	21.65
2	.86	20	8.66	70	30.32
5	2.16	25	10.82	80	34.65
10	4.33	40	17.32	100	43.31

NOTE:—Above information is quoted from standard authorities. Not guaranteed.

NUMBER OF GALLONS IN TANKS

Length or Depth in feet.	Diameter in Inches.									
	18	24	30	36	42	48	54	60	66	72
2	26	47	73	105	144	188	238	294	356	424
2½	33	59	90	131	180	235	298	367	445	530
3	40	71	109	157	216	282	357	440	534	636
3½	47	83	127	183	252	329	416	513	623	742
4	54	95	145	209	288	376	475	586	712	848
4½	61	107	163	235	324	423	534	659	801	954
5	68	119	180	261	360	470	593	732	890	1,060
5½	75	131	200	287	396	517	652	805	979	1,166
6	82	143	217	313	432	564	711	878	1,068	1,272
6½	89	155	235	339	468	611	770	951	1,157	1,378
7	96	167	253	365	504	658	829	1,024	1,246	1,484
7½	103	179	271	391	540	705	888	1,097	1,335	1,590
8	110	191	289	417	576	752	947	1,170	1,424	1,696
8½	.....	203	307	443	612	799	1,006	1,243	1,513	1,802
10	.....	239	361	521	720	940	1,183	1,462	1,780	2,120
12	.....	287	433	625	864	1,128	1,419	1,754	2,136	2,544
14	.....	.....	.....	.....	1,008	1,316	1,655	2,046	2,492	2,968
16	.....	.....	.....	.....	1,152	1,504	1,891	2,338	2,848	3,392
18	.....	.....	.....	.....	.....	.....	2,127	2,630	3,204	3,816
20	.....	.....	.....	.....	.....	.....	2,363	2,922	3,560	4,240

NOTE:—Above information is quoted from standard authorities. Not guaranteed.

EXPANSION OF WROUGHT IRON PIPE

Temperature of the air when pipe is fitted	Length of pipe when fitted	Length of pipe when heated to 215°	265°	297°	338°
		ft. in.	ft. in.	ft. in.	ft. in.
Zero	100 feet	100 1.72	100 2.12	100 2.31	100 2.70
32°	100 "	100 1.47	100 1.78	100 2.12	100 2.45
64°	100 "	100 1.21	100 1.61	100 1.87	100 2.19

VELOCITY OF FLOW OF WATER

IN FEET PER MINUTE, THROUGH PIPES OF VARIOUS SIZES FOR VARYING QUANTITIES OF FLOW

Gals. per min.	¾ inch	1 inch	1¼ inch	1½ inch	2 inch	2½ inch	3 inch	4 inch
5	218	122½	78½	54½	30½	19½	13½	7⅔
10	436	245	157	109	61	38	27	15⅓
15	653	367½	235½	163½	91½	58½	40½	23
20	872	490	314	218	122	78	54	30⅔
25	1090	612½	392½	272½	152½	97½	67½	38⅓
30	.....	735	451	327	183	117	81	46
35	.....	857½	549½	381½	213½	136½	94½	53⅔
40	.....	980	628	436	244	156	108	61⅓
45	.....	1102½	706½	490½	274½	175½	121½	69
50	.....	.....	785	545	305	195	135	76⅔
75	.....	.....	1177½	817½	457½	292½	202½	115
100	.....	.....	.....	1090	610	380	270	153⅓
125	.....	.....	.....	.....	762½	487½	337½	191⅔
150	.....	.....	.....	.....	915	585	405	230
175	.....	.....	.....	.....	1067½	682½	472½	268⅓
200	.....	.....	.....	.....	1220	780	540	306⅔

DECIMAL EQUIVALENTS OF FRACTIONS

Fraction	Dec. Equiv.	Fraction	Dec. Equiv.	Fraction	Dec. Equiv.	Fraction	Dec. Equiv.
1—64	0.015625	17—64	0.265625	33—64	0.515625	49—64	0.765625
1—32	0.031250	9—32	0.281250	17—32	0.531250	25—32	0.781250
3—64	0.046875	19—64	0.296875	35—64	0.546875	51—64	0.796875
1—16	0.062500	5—16	0.312500	9—16	0.562500	13—16	0.812500
5—64	0.078125	21—64	0.328125	37—64	0.578125	53—64	0.828125
3—32	0 093750	11—32	0.343750	19—32	0.593750	27—32	0.843750
7—64	0.109375	23—64	0.359375	39—64	0.609375	55—64	0.859375
1—8	0.125000	3—8	0.375000	5—8	0.625000	7—8	0.875000
9—64	0.140625	25—64	0.390625	41—64	0.640625	57—64	0.890625
5—32	0.156250	13—32	0 406250	21—32	0.656250	29—32	0.906250
11—64	0.171875	27—64	0.421875	43—64	0.671875	59—64	0.921875
3—16	0.187500	7—16	0.437500	11—16	0.687500	15—16	0.937500
13—64	0 203125	29—64	0.453125	45—64	0.703125	61—64	0.953125
7—32	0.218750	15—32	0.468750	23—32	0.718750	31—32	0.968750
15—64	0.234375	31—64	0.484375	47—64	0.734375	63—64	0.984375
1—4	0.250000	1—2	0.500000	3—4	0.750000	1—	1.000000

EQUALIZATION OF PIPE AREAS

* Diam. Pipes Inches	Number of Smaller Pipes Equivalent to one Larger Pipe											
	¾″	1″	1½″	2″	3″	4″	5″	6″	7″	8″	9″	10″
½	2.27	4.88	15.8	31.7	96.9	205.	377.	620.	918.			
¾	1.	2.05	6.9	14.	42.5	90.4	166.	273.	405.	569.	779.	
1		1.	3.5	6.8	20.9	44.1	81.1	133.	198.	278.	380.	536.
1½			1.	1.3	6.1	13.	23.8	39.2	58.1	81.7	112.	157.
2				1.	3.1	6.5	11.9	19.6	29.	40.8	55.8	78.5
2½					1.8	3.87	7.1	11.7	17.4	24.4	33.4	47.
3					1.	2.12	3.9	6.4	9.5	13.3	20.9	23.7
4						1.	1.8	3.	4.5	6.3	8.6	12.1
5							1.	1.6	2.4	3.4	4.7	6.6
6								1.	1.5	2.1	2.8	4.
7									1.	1.4	1.9	2.7
8										1.	1.3	1.9

*Normal diameters Standard Steam and gas pipe.

EXAMPLE

To find number of 2″ Pipes which will deliver as much fluid as one 5″ Pipe; In Column headed 5, and opposite 2, read 11.9 which is equivalent number of 2″ pipes.

Equation of Pipes.—To reduce pipes of different sizes to their equivalent in 1 inch, following factors are sufficiently accurate for Ordinary purposes.

1¼	1½	2	2½	3	3½	4	4½	5	6	7	8
x	x	x	x	x	x	x	x	x	x	x	x
126	144	181	219	266	304	342	380	423	503	580	655

TO FIND THE CAPACITY OF A TANK IN GALLONS

FIRST STEP. (All measurements to be in inches):

For Rectangular tanks multiply the length by the width, by the depth.

For Cylindrical Tanks, Multiply the length by the square of the diameter, by .7854.

For Elliptical Section Tanks, Multiply the length by the short diameter, by the long diameter, by .0339.

SECOND STEP.

Divide the result by 231 which is the number of cubic inches in one U.S. gallon, or by 277¼ the number of cubic inches in one Imperial gallon. The answer is the capacity of the tank in U.S. or Imperial Gallons as desired.

PROPERTIES OF SATURATED STEAM

Vacuum— Inches of Mercury	Absolute Pressure Lbs. per Sq. Inch	Temperature Fahrenheit	Total Heat above 32° F.		Latent Heat. Heat Units per lb.
			In the Water Heat Units per lb.	In the Steam Heat Units per lb.	
23.81	3.0	141.52	109.4	1121.6	1012.3
21.78	4.0	153.01	120.9	1126.5	1005.7
19.74	5.0	162.28	130.1	1130.5	1000.3
17.70	6.0	170.06	137.9	1133.7	995.8
15.67	7.0	176.85	144.7	1136.5	991.8
13.63	8.0	182.86	150.8	1139.0	988.2
11.60	9.0	188.27	156.2	1141.1	985.0
9.56	10.0	193.22	161.1	1143.1	982.0
7.52	11.0	197.95	165.7	1144.9	979.2
5.49	12.0	201.96	169.9	1146.5	976.6
3.45	13.0	205.87	173.8	1148.0	974.2
1.42	14.0	209.55	177.5	1149.4	971.9
Lbs. Gauge					
0.0	14.7	212.0	180.0	1150.4	970.4
0.3	15.0	213.0	181.0	1150.7	969.7
1.3	16.0	216.3	184.4	1152.0	967.6
2.3	17.0	219.4	187.5	1153.1	965.6
3.3	18.0	222.4	190.5	1154.2	963.7
4.3	19.0	225.2	193.4	1155.2	961.8
5.3	20.0	228.0	196.1	1156.2	960.0
10.3	25.0	240.1	208.4	1160.4	952.0
15.3	30.0	250.3	218.8	1163.9	945.1
20.3	35.0	259.3	227.9	1166.8	938.9
25.3	40.0	267.3	236.1	1169.4	933.3
30.3	45.0	274.5	243.4	1171.6	928.2
40.3	55.0	287.1	256.3	1175.4	919.0
50.3	65.0	298.0	267.5	1178.5	911.0
60.3	75.0	307.6	277.4	1181.1	903.7
70.3	85.0	316.3	286.3	1183.4	897.1
80.3	95.0	324.1	294.5	1185.4	890.9
91.3	106.0	332.0	302.7	1187.4	884.7
101.3	116.0	338.7	309.6	1189.0	879.3
125.3	140.0	353.1	324.6	1192.2	867.7
151.3	166.0	366.5	338.7	1195.1	856.4
175.3	190.0	377.6	350.4	1197.3	846.9
200.3	215.0	388.0	361.4	1199.2	837.9
225.3	240.0	397.4	371.4	1200.9	829.5
255.3	270.0	407.9	382.5	1202.6	820.1

HEAT UNITS AND WEIGHT OF WATER

Heat units in water, between 32 and 212 degrees Fahrenheit and weight of water per cubic foot.

Tem Deg. Fahr.	Heat Units	Weight lbs. per cub. ft.	Tem. Deg. Fahr.	Heat Units	Weight, lbs. per cub. ft.	Tem. Deg. Fahr.	Heat Units	Weight lbs. per cub. ft.
32	0.	62.42	123	91 16	61.68	168	136.44	60.81
35	3.	62.42	124	92.17	61.67	169	137.45	60.79
40	8.	62.42	125	93.17	61.65	170	138 45	60.77
45	13.	62.42	126	94.17	61.63	171	139.46	60.75
50	18.	62.41	127	95.18	61.61	172	140.47	60.73
52	20.	62.40	128	96.18	61.60	173	141.48	60.70
54	22.01	62.40	129	97.19	61.58	174	142.49	60.68
56	24 01	62.39	130	98.19	61.56	175	143.50	60.66
58	26.01	62.38	131	99.20	61.54	176	144.51	60.64
60	28.01	62.37	132	100.20	61.52	177	145.51	60.62
62	30.01	62.36	133	101.21	61.51	178	146.52	60.59
64	32.01	62.35	134	102.21	61.49	179	147.53	60.57
66	34.02	62.34	135	103 22	61.47	180	148.54	60.55
68	36.02	62.33	136	104.22	61.45	181	149.55	60.53
70	38.02	62.31	137	105.23	61.43	182	150.56	60.50
72	40.02	62.30	138	106.23	61.41	183	151.57	60.48
74	42.03	62.28	139	107.24	61.39	184	152.58	60.46
76	44.03	62.27	140	108.25	61.37	185	153.59	60.44
78	46.03	62.25	141	109.25	61.36	186	154.60	60 41
80	48 04	62.23	142	110.26	61.34	187	155.61	60 39
82	50.04	62.21	143	111.26	61.32	188	156.62	60.37
84	52.04	62.19	144	112.27	61.30	189	157.63	60.34
86	54.05	62.17	145	113.28	61.28	190	158.64	60.32
88	56.05	62.15	146	114.28	61.26	191	159.65	60.29
90	58.06	62.13	147	115.29	61.24	192	160.67	60.27
92	60.06	62 11	148	116.29	61.22	193	161.68	60.25
94	62.06	62.09	149	117.30	61.20	194	162.69	60.22
96	64.07	62.07	150	118.31	61.18	195	163.70	60.20
98	66.07	62.05	151	119.31	61.16	196	164.71	60.17
100	68.08	62.02	152	120.32	61.14	197	165.72	60.15
102	70.09	62.00	153	121.33	61.12	198	166.73	60.12
104	72.09	61 99	154	122.33	61.10	199	167.74	60.10
106	74.10	61.95	155	123.34	61.08	200	168.75	60.07
108	76.10	61 92	156	124.35	61.06	201	169.77	60.05
110	78.11	61.89	157	125.35	61.04	202	170.78	60.02
112	80.12	61.86	158	126.36	61.02	203	171.79	60.00
114	82.13	61.83	159	127.37	61 00	204	172.80	59.97
115	83.13	61.82	160	128.37	60.98	205	173.81	59.95
116	84.13	61.80	161	129.38	60.96	206	174.83	59.92
117	85.14	61.78	162	130.39	60 94	207	175.84	59.89
118	86.14	61.77	163	131.40	60.92	208	176.85	59.87
119	87.15	61.75	164	132.41	60 90	209	177.86	59.84
120	88 15	61.74	165	133.41	60.87	210	178.87	59.82
121	89 15	61.72	166	134.42	60.85	211	179.89	59.79
122	90.16	61.70	167	135.43	60.83	212	180.90	59.76

NOTE:—Above information is quoted from standard authorities.

AREAS OF CIRCLES

Size	Area	Size	Area	Size	Area	Size	Area
1/8	0.0123	10	78.54	30	706.86	65	3318.3
1/4	0.0491	1/2	86.59	31	754.76	66	3421.2
3/8	0.1104	11	95.03	32	804.24	67	3525.6
1/2	0.1963	1/2	103.86	33	855.30	68	3631.6
5/8	0.3067	12	113.09	34	907.92	69	3739.2
3/4	0.4417	1/2	122.71	35	962.11	70	3848.0
7/8	0.6013	13	132.73	36	1017.8	71	3959.2
1	0.7854	1/2	143.13	37	1075.2	72	4071.5
1/8	0.9940	14	153.93	38	1134.1	73	4185.3
1/4	1.227	1/2	165.13	39	1194.5	74	4300.8
3/8	1.484	15	176.71	40	1256.6	75	4417.8
1/2	1.767	1/2	188.69	41	1320.2	76	4536.4
5/8	2.073	16	201.06	42	1385.4	77	4656.0
3/4	2.405	1/2	213.82	43	1452.2	78	4778.3
7/8	2.761	17	226.98	44	1520.5	79	4901.6
2	3.141	1/2	240.52	45	1590.4	80	5026.5
1/4	3.976	18	254.46	46	1661.9	81	5153.0
1/2	4.908	1/2	268.80	47	1734.9	82	5281.0
3/4	5.939	19	283.52	48	1809.5	83	5410.6
3	7.068	1/2	298.64	49	1885.7	84	5541.7
1/4	8.295	20	314.16	50	1963.5	85	5674.5
1/2	9.621	1/2	330.06	51	2042.8	86	5808.8
3/4	11.044	21	346.36	52	2123.7	87	5944.6
4	12.566	1/2	363.05	53	2206.1	88	6082.1
1/2	15.904	22	380.13	54	2290.2	89	6221.1
5	19.635	1/2	397.60	55	2375.8	90	6361.7
1/2	23.758	23	415.47	56	2463.0	91	6503.8
6	28.274	1/2	433.73	57	2551.7	92	6647.6
1/2	33.183	24	452.39	58	2642.0	93	6792.9
7	38.484	1/2	471.43	59	2733.9	94	6939.7
1/2	44.178	25	490.87	60	2827.4	95	7088.2
8	50.265	26	530.93	61	2922.4	96	7238.2
1/2	56.745	27	572.55	62	3019.0	97	7389.8
9	63.617	28	615.75	63	3117.2	98	7542.9
1/2	70.882	29	660.52	64	3216.9	99	7697.7

To find the diameter of a circle when circumference is given, multiply the given circumference by .31831.

CIRCUMFERENCE OF CIRCLES

Diam.	Circum-ference	Diam.	Circum. ference	Diam.	Circum-ference	Diam.	Circum-ference
	.3927	10	31 .416	30	94 .248	65	204 .204
1/4	.7854	1/2	32 .987	31	97 .389	66	207 .345
3/8	1 .1781	11	34 .558	32	100 .531	67	210 .487
1/2	1 .5708	1/2	36 .128	33	103 .673	68	213 .628
5/8	1 .9635	12	37 .699	34	106 .814	69	216 .770
3/4	2 .3562	1/2	39 .270	35	109 .956	70	219 .911
7/8	2 .7489	13	40 .841	36	113 .097	71	223 .053
1	3 .1416	1/2	42 .412	37	116 .239	72	226 .195
	3 .5343	14	43 .982	38	119 .381	73	229 .336
1/4	3 .9270	1/2	45 .553	39	122 .522	74	232 .478
3/8	4 .3197	15	47 .124	40	125 .664	75	235 .619
1/2	4 .7124	1/2	48 .695	41	128 .805	76	238 .761
5/8	5 .1051	16	50 .265	42	131 .947	77	241 .903
3/4	5 .4978	1/2	51 .836	43	135 .088	78	245 .044
7/8	5 .8905	17	53 .407	44	138 .230	79	248 .186
2	6 .2832	1/2	54 .978	45	141 .372	80	251 .327
1/4	7 .0686	18	56 .549	46	144 .513	81	254 .469
1/2	7 .8540	1/2	58 .119	47	147 .655	82	257 .611
3/4	8 .6394	19	59 .690	48	150 .796	83	260 .752
3	9 .4248	1/2	61 .261	49	153 .938	84	263 .894
1/4	10 .210	20	62 .832	50	157 .080	85	267 .035
1/2	10 .996	1/2	64 .403	51	160 .221	86	270 .177
3/4	11 .781	21	65 .973	52	163 .363	87	273 .319
4	12 .566	1/2	67 .544	53	166 .504	88	276 .460
1/2	14 .137	22	69 .115	54	169 .646	89	279 .602
5	15 .708	1/2	70 .686	55	172 .788	90	282 .743
1/2	17 .279	23	72 .257	56	175 .929	91	285 .885
6	18 .850	1/2	73 .827	57	179 .071	92	289 .027
1/2	20 .420	24	75 .398	58	182 .212	93	292 .168
7	21 .991	1/2	76 .969	59	185 .354	94	295 .310
1/2	23 .562	25	78 .540	60	188 .496	95	298 .451
8	25 .133	26	81 .681	61	191 .637	96	301 .593
1/2	26 .704	27	84 .823	62	194 .779	97	304 .734
9	28 .274	28	87 .965	63	197 .920	98	306 .876
1/2	29 .845	29	91 .106	64	201 .062	99	311 .018

To find the circumference of a circle when diameter is given multiply the given diameter by 3.1416.

TO DETERMINE BOILER CAPACITY REQUIRED TO HEAT SWIMMING POOL

L x W x D equals cubic feet; where L equals the length of the pool in feet, W equals the width and D equals the average depth of the water.

From table page 124, determine the number of pounds per cubic foot at initial temperature of the water. This quantity multiplied by the number of cubic feet gives the number of pounds of water to be heated.

Pounds of water multiplied by the difference between initial and final temperature equals B. T. U. to be supplied, and dividing by the number of hours allowed for heating gives number of B. T. U. required to be supplied per hour.

Divide B. T. U. required per hour by 150 to determine rating of water boiler, or by 240 to determine rating of steam boiler.

NOTE:—If quantity of water is given in gallons multiply by 8⅓, (approximately 8⅓ pounds to the gallon) to reduce it to pounds.

LOSS OF HEAT FROM ACCUMULATION OF SOOT

Showing the loss in conductivity of boiler plate due to difference in thickness of soot deposit.

Thickness of Soot	Loss Per Cent.
Clean	0.0
1/32"	9.5
1/16"	26.2
1/8"	45.2
3/16"	69.0

*Proceedings, Institute of Marine Engineers, January 6, 1908.

RELATIVE VALUE OF HEATING SURFACES

Horizontal Surfaces above the flame, equal.....1.00
Vertical Surfaces above the flame, equal..... .50
Horizontal Surfaces beneath the flame..... .10
Tubes and Flues equal 1¼ times their diameter.
Convex Surfaces above the flame equal 1 1/6 diameter.

DATA ON FUELS

Comparative Costs of Heating by Electricity, Fuel Oil, Hard and Soft Coal

The examples shown below will give anyone the necessary information to determine the comparative cost of heating a building by electricity, fuel oil, hard and soft coal, by using the figures or costs of the fuels mentioned in his own locality.

Heating by Electricity—

The Heating Value of one kilowatt-hour is approximately 3,400 thermal units, therefore at 2 cents per K.W.H., one cent will purchase 1,700 thermal units.

Heating by Hard Coal—

The heating value of a pound of coal is about 8,000 thermal units. At $15.00 per ton, one cent will purchase about 10,666 thermal units.

Heating by Fuel Oil—

The available heating value of one Imperial gallon of fuel oil for heating purposes is approximately 140,000 thermal units. At 10.8 cents per Imperial gallon, one cent will purchase about 12,960 thermal units.

Heating by Soft Coal—

The available heating value of a pound of soft coal is about 6,000 thermal units. With fair grades of soft coal priced at $9.00 per ton, one cent will purchase about 13,330 thermal units.

Comparison—

With electricity, coal, and oil, at the prices shown above, it will be seen that heating by electricity costs about six and two-thirds times as much as by hard coal, about 8 times as much as by soft coal, and about seven and one-half times as much as by fuel oil. At present, oil and hard coal costs are much the same, but oil is a little more costly than soft coal.

DATA ON FUELS—*Continued*

Average Weight of Coal.

1 cu. ft. of Hard Coal weighs about.... 50 pounds
1 cu. ft. of Soft Coal weighs about..... 40 pounds
1 cu. ft. of Coke, weighs about..... 28 pounds

Names and Sizes of Anthracite or "Hard" Coal

Names of Sizes	Mesh it will Pass Through		Mesh it Will not Pass Through	
Grate.....	4" Sqr.	4½" Rd.	2¾" Sqr.	3⅛" Rd.
Egg.....	2¾" "	3⅛" "	2 " "	2¼" "
Stove.....	2" "	2¼" "	1⅜" "	1 9/16" "
Nut.....	1⅜" "	1 9/16" "	¾" "	⅞" "
Pea.....	¾" "	⅞" "	½" "	9/16" "
Buckwheat..	½" "	9/16" "	¼" "	5/16" "
Rice.....	¼" "	5/16" "	⅛" "	3/16" "
Barley.....	⅛" "	3/16" "	.....	3/32" "

Names and Sizes of Bituminous or "Soft" Coal

For "Domestic" Soft Coals there are no uniform names and sizes; but they are usually marketed under these classes.

"Screenings".....Usually smallest sizes.
"Duff".....Goes through ⅛ in. screen.
"No. 3 Nut".....Goes through 1¼ in. screen, over ¾ in. screen.
"No. 2 Nut".....Goes through 2 in. screen, over 1¼ in. screen.
"No. 1 Domestic Nut".....Goes through 3 in. screen, over 1½ or 2 in. screen.
"No. 4 Washed".....Goes through ¾ in. screen, over ¼ in. screen.
"No. 3 Washed Chestnut"..Goes through 1¼ in. screen, over ¾ in. screen.
"No. 2 Washed Stove".....Goes through 2 in. screen, over 1¼ in. screen.
"No. 1 Washed Egg".....Goes through 3 in. screen, over 2 in. screen.
"No. 3 Roller Screened Nut".Goes through 1½ in. screen, over 1 in. screen.
"No. 2 Roller Screened Nut".Goes through 2 in. screen, over 1½ in. screen.

DATA ON FUELS—*Continued*

"No. 1 Roller Screened Nut".Goes through 3½ in. screen,over 2 in. screen.

"Egg".....Goes through 6 in. screen, over 3 in. screen.

"Lump" or "Block".....Goes through 6 in. screen, or over.

"Run of Mine".....In fine and large lumps.

Pocahontas Smokeless.....Generally sized as "Nut," "Egg" "Lump" and "Mine Run".

Cannell Coal.....For Fire Places—"Hand Picked Lump"; for Stoves—"Egg".

Domestic By-product Coke..."Egg", 3 in.-2½ in.; "Large Stove" 2½ in.-2 in.; "Small Stove" 2 in.-1½ in.; "Nut" 1½ in.-¾in.; "Pea" ¾ in.-½ in.

Evaporating Power of Fuels

Under Favorable Conditions:—

1 pound of Oil will evaporate from 14 to 16 pounds of water from and at 212°.

1 pound of Coal will evaporate from 7 to 10 pounds of water from and at 212°.

1 pound of Natural Gas (21.9 cu. ft.) will evaporate from 18 to 20 pounds of water from and at 212°.

ERECTING AND PLACING BOILERS

Be careful to have base level before setting the boiler on it.

Make sure that there is sufficient head room for the smoke pipe, and for a proper grade for the mains before setting the boiler. If it is impossible to obtain sufficient head room the boiler should be set in a pit. See page 139 for further particulars.

The boiler should be placed as close to the chimney as possible.

The boiler should be covered with asbestos or other non-inflammable material which conserves the heat and prevents cold air being drawn into the boiler through the fire joints.

In calculating the heating capacity of boiler required when using a coil or any kind of heater in the boiler for the purpose of heating water in the range boiler, an allowance should be made of 3 square feet of heating capacity for every gallon of water to be heated.

Instructions should always be given the parties for whom the boiler is installed, setting forth the proper method of operating. Particular **attention** should be given to the fact that the grates will be burned out if the ashes are not removed regularly.

It is advisable that a hot water thermometer be provided for every plant, and necessary instructions given as to the proper temperature at which the water should be maintained, according to weather, etc.

*To Clean a Water Gauge Glass on a Steam Boiler

Put in a cup of hot water a tablespoonful of Raw Muriatic or other acid, then close the top and bottom water gauges, open top water gauge and blow water out of glass through pet-cock at bottom, again close top valve and place cup of hot water so bottom pet-cock is submerged in the solution, a vacuum being caused the acid and water will fill the gauge glass. By keeping the pet-cock in the water and alternately opening and closing the top water gauge the glass will be thoroughly cleansed. Then close pet-cock and open both water gauge cocks. The water line of the boiler will again show. It is necessary to have a pressure of one or two pounds on the boiler before proceeding as above.

BLOWING OFF A STEAM BOILER

A steam boiler should be blown off within one week after it is in operation, to remove the unavoidable accumulation of oil, grease, etc., which have a tendency to cause foaming, preventing the generation of steam and causing an unsteady water line. This can only be done when the boiler is under pressure. If one blowing off does not result in a steady water line and clean gauge, the operation must be repeated a second, or if necessary, a third and fourth time.

1. Close all radiator valves, or, if the mains are valved, close both Flow and Return valves tightly. Remove damper regulator and plug the opening.
2. Remove the safety valve and connect a blow-off pipe to the opening, extending to suitable drain or out of the basement window. The size of this pipe should be the same as the safety valve, and should be provided with full size cock.
3. With a wood fire and boiler filled to top of water glass, raise steam pressure to fifteen pounds. Open cock in safety valve pipe, allowing pressure to cause water to be siphoned through this pipe, thus carrying away the surface grease and oil, and maintain the steam pressure at fifteen pounds. Supply cold water at the bottom of the boiler to maintain water line at the top of the gauge glass. After this operation has been continued for two hours, close the upper blow-off cock and water supply, and open blow-off at bottom of boiler, being careful that sufficient fire is carried to maintain a pressure until the last gallon of water is blown out.
4. Draw the remaining fire and open all fire and flue doors wide.
5. Allow the boiler to become cool, close blow-off, remove piping from safety valve opening, replace safety valve and damper regulator, and fill boiler slowly to normal water line.
6. Open radiator, flow and return valves.
7. Re-build fire.

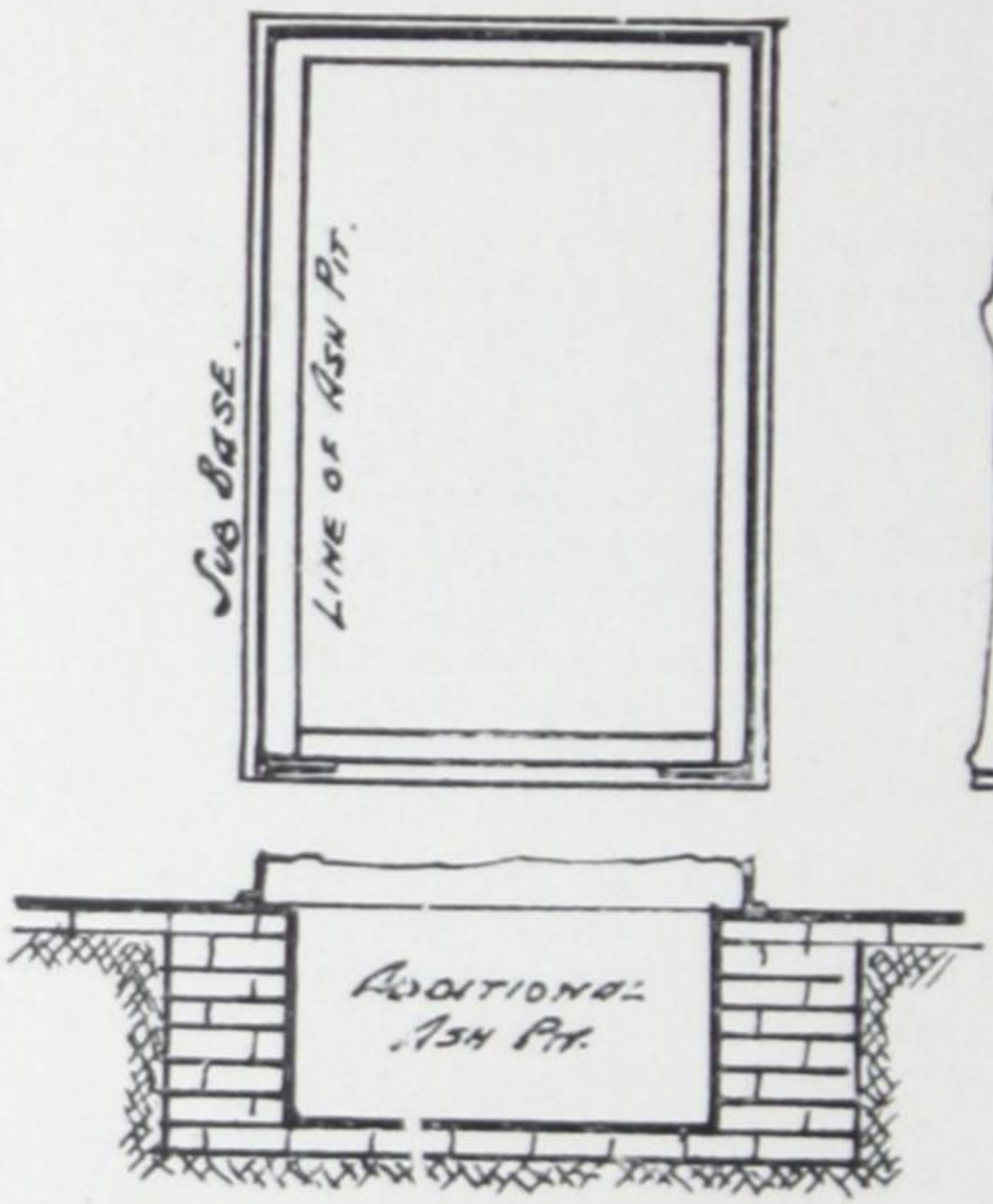
In boilers where a large amount of oil and grease is present, it may be desirable to add a small quantity of soda ash, which should be boiled in boiler for half an hour before the blowing-off operation is started.

Five pounds of Soda Ash for small sizes up to thirty pounds for the largest boilers, will usually be sufficient.

In cases where there is no water supply pressure, the surface blowing-off cannot be a continuous operation. Therefore, the bottom blow-off should be repeated several times.

BOILER FOUNDATIONS

In setting heating boilers, either round or square, the contractor should first note that the foundation is level and firm. A space left underneath the base allows the air to draw in ash-pit, the same as when the draft door is open. This air leakage accounts for the large consumption of fuel often found in residence heating boilers.



As about 95 per cent. of all burned-out grate bars are directly traceable to the accumulation of ashes under grates, it will be found of much value, when the condition will permit, to deepen the ash-pit by either making a raised foundation of brick under edge of boiler, or by excavating and cementing the sides and ends as shown by the illustration above.

INSTRUCTIONS FOR COVERING BOILERS, HEATERS, ETC., WITH ASBESTOS CEMENT

The cement is usually applied in three coats ½" to ¾" thick regulated according to the total thickness required. The material is mixed with water in an ordinary box to a consistency of mortar and should be allowed to stand several hours before using. Use an ordinary plasterer's trowel for applying.

Apply first coat (about ½" thick) to the boiler while it is warm, leaving the surface rough in order that the second coat may properly adhere. Stop back about 1 inch from all manholes, doors and other openings, and when putting on last coat, finish up the edges around all openings to a nice level. When the first coat is thoroughly dry, the second coat may be applied in the same manner as the first, leaving it rough for the reception of the next coat. For the third coat mix Portland Cement with the Asbestos Cement, proportions half and half, and after applying, smooth it down, a hard finish will result.

NOTE:—The boiler should be kept quite hot during the application, as each coat should be thoroughly dry before proceeding with the next.

CLEANING STEAM BOILERS IN SPRING

At the close of the heating season fill the steam boiler with water to the safety valve and let it thus stand through the summer. Disconnect smokepipe, thoroughly clean it, and store away in a dry place Leave boiler doors open. Clean all the inner surfaces, and at the opening of the next season withdraw the water and refill with fresh water to the water line, starting the boiler as before. See that the cement between the sections is in place, if it has dropped out, have the joints tightly re-cemented.

RULES RELATIVE TO THE CIRCLE

TO FIND CIRCUMFERENCE—Multiply diameter by 3.1416
Or divide diameter by 0.3183

TO FIND DIAMETER—Multiply circumference by 0.3183
Or divide circumference by 3.1416

TO FIND RADIUS—Multiply circumference by 0.15915
Or divide circumference by 6.28318

TO FIND SIDE OF AN INSCRIBED SQUARE:—
Multiply diameter by 0.7071
Or multiply circumference by 0.2251
Or divide circumference by 4.4428

TO FIND SIDE OF A SQUARE OF EQUAL AREA:—
Multiply diameter by 0.8862
Or divide diameter by 1.1284
Or multiply circumference by 0.2821
Or divide circumference by 3.545

SQUARE:—A side multiplied by 1.4142 equals diameter of its circumscribing circle.

A side multiplied by 4.443 equals circumference of its circumscribing circle.

A side multiplied by 1.1284 equals diameter of a circle of equal area.

A side multiplied by 3.545 equals circumference of an equal circle.

TO FIND THE AREA OF A CIRCLE:—See table page 138.
Multiply circumference by one-quarter of the diameter.
Or multiply the square of diameter by 0.7854.
Or multiply the square of circumference by 0.07958.
Or multiply the square of one-half diameter by 3.1416.

TO FIND THE AREA OF AN ELLIPSE:—
Multiply the product of its axis by .7854.
Or multiply the products of its semi-axis by 3.14159.

TO FIND THE SURFACE OF A SPHERE OR GLOBE:—
Multiply the diameter by the circumference.
Or multiply the square of diameter by 3.1416.
Or multiply 4 times the square of radius by 3.1416.

TO FIND THE AREA OF TRIANGLE:—
Multiply base by one-half altitude.

TO FIND THE PERIMETER OF AN ELLIPSE:—
Multiply the greater axis by 1.82 and the smaller axis by 1.315 and add the results.

USEFUL DATA

Water Boils in open vessel, atmospheric pressure sea level at 212°.

Water Boils at lesser temperature than 212° when atmospheric pressure is less, as in case of higher altitudes. The temperature of the resultant vapor or steam will be proportionately less.

Water Boils in vacuum at 98°. Hence resultant vapor is 98°.

Water Expands about one-tenth in bulk by freezing.

Water Expands in heating from 39 to 212° one twenty-third or about 4 per cent. in bulk.

Water has greatest density or occupies least space at 39° Fah.

A Cubic Inch of Water evaporated at atmospheric pressure 14.7 lbs. makes (approximately) one cubic foot of steam.

A Column of Water 27.67 inches high has a pressure of one pound to the inch, approximately it is estimated that every foot of water equals one-half pound pressure.

Multiplying the Height of a Column of Water by .434 gives pressure in pounds.

A Cubic Foot of Water weighs 62.321 pounds and equals 7.48 U.S. gallons.

Water in Circulation is the best known absorbent of heat, and gives out more heat in cooling through a given range of temperature than any known substance.

A Hundred Square Feet of radiation contains approximately 15 gallons of water.

Bodies which Absorb Heat Best, Radiate it Best.

Heat Unit, known as **British Thermal Unit,** or B.T.U., raises temperature of one pound of water one degree Fah.

Heat Unit is 1° or 1/180° of the distance between freezing and boiling point of water.

Heat Unit. 966 heat units will evaporate one pound of water at 212° into steam.

Heat Units emitted per hour by a square foot of cast iron radiation, under favorable conditions, will be two for each degree of difference between the temperature of the radiator and surrounding air.

Heat Unit. A pound of anthracite coal contains 14,500 heat units.

The Commercial Ratings of Low Pressure Steam Heaters are based upon a pressure of 2 pounds of steam (219°) and of **water heaters** an average temperature of the water of circulation of 170° in their maximum service. Systems of heating that provide for higher pressure and temperatures, larger size heaters must be used.

Horse Power is a very elastic phrase as applied to boilers, and quite empirical. It may serve as a descriptive or comparative term but not as expressing any comprehensible power.

A Horse Power. That Power required to raise 33,000 pounds one foot per minute.

A Horse Power. The equivalent of 33,000 heat units per hour.

A Horse Power. That necessary to evaporate 30 pounds of water per hour from 100° 70 pounds pressure, feed water 100°.

A Horse Power. Fifteen square feet of heating surface in a standard tubular boiler is estimated as equal to one horse power.

A Horse Power is estimated equal 75 to 100 square feet direct radiation.

Area of a Circle. Multiply square of its diameter by .7854.

USEFUL DATA—Continued

1 Pound of Oil, equals-19500 B.T.U.'s.

Doubling the Diameter of a Pipe increases its capacity four times.

Wrought Iron Steam and Gas Pipe is reckoned by its internal diameter.

Boiler Tubes are reckoned by their external diameter.

Area of Chimney should be one-seventh to one-tenth area of grate.

One Square Foot of Grate Area will average in consumption in low pressure steam boilers 3 to 5 pounds anthracite coal per hour.

One Square Foot of Grate Area will average in consumption in high pressure steam boilers 12 pounds anthracite coal per hour.

Average Consumption of fuel is 7½ pounds coal or 15 pounds dry pine wood to evaporate one cubic foot of water.

One Bushel anthracite coal weighs 86 pounds, at 14,500 B.T.U. per pound equals 1,247,000 B.T.U.

One Bushel bituminous coal weighs 76 pounds, at 11,600 B.T.U. per pound equals 881,600 B.T.U.

One Bushel Connellsville coke weighs 40 pounds, at 11,600 B.T.U. per pound equals 464,000 B.T.U.

One Bushel charcoal weighs 30 pounds, at 13.920 B.T.U. per pound equals 417,600 B.T.U.

A Ton of Hard Coal occupies a space equal to 37 cubic feet.

A Ton of Soft Coal occupies a space equal to 40 cubic feet.

A Ton and a Half Hard Coal to a hundred square feet water radiation, or to fifty square feet steam radiation, is the estimated fuel consumption for the winter's firing.

A Ton of Hard Coal is considered equal to a ton and a half of soft coal.

One pound of Gold or Color Bronze requires one quart of liquid and will cover from 250 to 300 feet of radiation.

One pound of Aluminum Bronze requires three quarts of liquid and will cover from 500 to 600 square feet of radiation.

B.T.U. divided by 33,000 equals H.P.

B.T.U. divided by 250 equals steam radiation, square feet.

B.T.U. divided by 150 equals water radiation, square feet.

B.T.U. divided by 50 equals cubic feet of air warmed 1 degree per hour.

One Kilowatt Hour equals 3412 B.T.U.'s

One Watt Hour equals 3.412 B.T.U.'s

One B.T.U. equals 0.293 Waat Hour.

Steam is the vapor rising from water at or above its boiling point. 212 degrees sea level.

Steam Proper is transparent and colorless, dry and wholly invisible except when partly condensed, when it is moist.

Low Pressure Steam is steam pressure not exceeding 15 pounds per square inch.

Super Heated Steam is steam heated to a temperature higher than is due to its pressure after leaving the fluid from which it is formed.

Saturated Steam is steam which in contact with the fluid from which it is formed carries with it a proportion of its moisture.

USEFUL INFORMATION

BOILING POINTS OF VARIOUS FLUIDS

Water in Vacuum	98°	Refined Petroleum	316°
Water, Atmospheric Pressure	212°	Turpentine	315°
Alcohol	173°	Sulphur	570°
Sulphuric Acid	240°	Linseed Oil	597°

MELTING POINTS OF DIFFERENT METALS

Aluminium	1400°	Iron (cast)	2450°
Antimony	810°	Iron (wrought)	2912°
Bismuth	476°	Lead	608°
Brass	1900°	Platinum	3080°
Bronze	1692°	Silver (pure)	1873°
Copper	1996°	Steel	2500°
Glass	2377°	Tin	446°
Gold (pure)	2590°	Zinc	680°

NOTE:—Above information is quoted from standard authorities.

MISCELLANEOUS WEIGHTS AND INFORMATION

One cubic inch of Cast Iron	weighs	0.26	pounds
One cubic inch of Wrought Iron	weighs	0.28	pounds
One U.S. Gallon at 231 cubic inches of water at 62°	weighs	8.3356	pounds
One Imp. Gal. at 277.274 cub, inches of wate at 62°	weighs	10.	pounds
One cubic inch of water	weighs	0.36	pounds
One cubic foot of water	equals	7.48	U.S. gallons
One cubic foot of water	equals	6.23	Imp. gallons
One pound of steam	equals	27.222	cubic feet
One pound of air	equals	13.817	cubic feet

WEIGHT OF ONE CUBIC FOOT OF PURE WATER

1 cubic foot of water at 32° (Freezing Point)	weighs	62.418	pounds
1 cubic foot of water at 39.1° (Maximum density)	weighs	62.425	pounds
1 cubic foot of water at 62° (Standard temperature)	weighs	62.355	pounds
1 cubic foot of water at 212° (boiling point) at 1 atmosphere	weighs	59.76	pounds

TO CALCULATE INTEREST (2% TO 10%)

Multiply the principal by the number of days and divide as follows:—

Per cent	Divide by	Per cent.	Divide by
2 per cent	180	6 per cent	60
2½ per cent	144	7 per cent	52
3 per cent	120	8 per cent	45
4 per cent	90	9 per cent	40
5 per cent	72	10 per cent	36

USEFUL INFORMATION—Continued

TABLE OF WEIGHTS, LENGTHS AND MEASURES

LONG MEASURE

12 Inches	=	1 Foot
3 Feet	=	1 Yard
5½ Yards	=	1 Rod
40 Rods	=	1 Furlong
8 Furlongs	=	1 Statute Mile
3 Miles	=	1 League°

SQUARE MEASURE

144	sq. inches	=	1 sq. foot
9	sq. feet	=	1 sq. yard
30¼	sq. yards	=	1 sq. rod
40	sq. rods	=	1 rood
4	roods	=	1 acre
640	acres	=	1 sq. mile

SURVEYOR'S MEASURE

7.92 Inches	=	1 Link
25 Links	=	1 Rod
4 Rods	=	1 Chain
100 Links	=	1 Chain
66 Feet	=	1 Chain
80 Chains	=	1 Mile

SURVEYOR'S SQUARE MEASURE

625 Square links	=	1 Square rod
16 Square rods	=	1 Square chain
10 Square chains		
or		
160 Square rods	=	1 Acre
640 Acres	=	1 Square mile
36 Square miles		
6 Miles square	=	1 Township

An acre has roughly 4 equal sides of 69½ yards each.

A square half acre has sides of about 147 ft.

A Square quarter acre has sides of about 104 ft.

CUBIC MEASURE

1728 Cubic Inches	=	1 Cubic Foot
27 Cubic Feet	=	1 Cubic Yard
2150.42 Cu. Inches	=	1 Stand. Bush.
231 Cubic Inches	=	1 U.S. Gallon
277.274 Cu. Inches	=	1 Imp. Gallon
1 Cubic Foot	=	about ¾ bush.
128 Cubic feet	=	1 Cord (wood)
40 Cubic feet	=	1 ton (ship'ng)

LIQUID MEASURE

4	gills	make 1 pint.
2	pints	make 1 quart.
4	quarts	make 1 gallon.
31½	gallons	make 1 barrel
2	barrels	make 1 hogshead.

DRY MEASURE

2 Pints	=	1 Quart
8 Quarts	=	1 Peck
4 Pecks	=	1 Bushel
36 Bushels	=	1 Chaldron

AVOIRDUPOIS WEIGHT

437.5 Grains	=	1 ounce
16 Ounces	=	1 Pound
100 Pounds	=	1 Cwt.
2000 Pounds	=	1 Ton

LONG TON WEIGHT

16 ounces	=	1 Pound
112 Pounds	=	1 cwt.
2240 Pounds	=	1 Ton

TROY WEIGHT

24 Grains	=	1 Pennyweight
20 Pennyweight	=	1 Ounce
12 Ounces	=	1 Pound

used for weighing Gold, Silver and Jewels.

APOTHECARY'S WEIGHT

20 Grains	=	1 scruple
3 Scruples	=	1 dram
8 Drams	=	1 ounce
12 Ounces	=	1 pound

MEASURE OF ANGLES OR ARCS

60 Seconds (″)	=	1 minute
60 Minutes	=	1 Degree°
90 Degrees	=	1 Rt. Angle or Quadrant
360 Degrees	=	1 circle

CLOTH MEASURE

2½ Inches	=	1 nail
4 Nails	=	1 Quarter
4 Quarters	=	1 Yard

USEFUL INFORMATION—Continued

TABLE OF WEIGHTS, LENGTHS AND MEASURES

Lengths and Weights and their approximate equivalents in the Metric System

LENGTH

1 Meter	= 39.37 inches
1 Meter	= 3.3 feet
1 Inch	=2.54 centimeters
1 Foot (12 ins.)	=3048 centimeters
2 Inches	= 5 centimeters
4 Inches	= 10 centimeters
8 Inches	= 20 centimeters
12 Inches (1 foot)	=3048 centimeters
16 Inches	= 40 centimeters
20 Inches	= 50 centimeters
4 Feet	=1.22 meters
8 Feet	=2.438 meters
12 Feet	=3.658 meters

LENGTH

16 Feet	= 4.877 meters
20 Feet	= 6.096 meters
24 Feet	= 7.315 meters
30 Feet	= 9.144 meters
72 Feet	= 21.9456 meters

WEIGHTS

1 Pound or 453,592 Grains	=0.4536 kilograms
1 Grain	=0.03527 ounce
100 Pounds	=45.36 kilograms
1 Kilogram	=2.2046 pounds
25 Pounds	=11.34 kilograms
100 Pounds	=45.36 kilograms

NOTE:—Above information is quoted from standard authorities.

MISCELLANEOUS

20 articles	=	1 score
24 sheets	=	1 quire
20 quires	=	1 ream

MEASURE OF CAPACITY

Imperial Gallons	U.S. Gallons	Cubic Feet	Cubic Inches	Litres
1	1.2003	.1605	277.27	4.543
.833	1.	.1337	231.	3.785
6.23	7.48	1.	1728.	28.31
.0036	.0043	.00058	1.	.0164
.2201	.2642	.0353	61.03	1.

U.S. Gallons Multiplied by 0.83 equals Imp. Gallons.
Imp. Gallons Multiplied by 1.20 equals U.S. Gallons.

LEGAL WEIGHTS OF PRODUCE IN CANDAA

Lbs. per Bush.	Lbs. per Bush.	Lbs. per Bush.
	Peas....60	
Wheat....60	White Beans....60	Clover Seed....60
Corn in Ear....70	Castor Beans....40	Flax Seed....56
Corn shelled....56	Irish Potatoes....60	Millett Seed....50
Rye....56	Onions....50	Hungarian Grass....50
Buckwheat....48	Turnips....60	Timothy Seed....48
Barley....48	Beets....60	Bluegrass Seed....14
Oats....34	Carrots and Parsnips..60	Hemp Seed....44

TELEGRAPH CODE

BOILERS

NEW KING ROUND STEAM BOILERS		
Size	High Base	Low Base
4-19-S	Bewail	Bewaiting
5-19-S	Bewitch	Bewitching
4-22-S	Bigamy	Bigamist
5-22-S	Bigeted	Bigotry
4-25-S	Bishop	Bismuth
5-25-S	Blanche	Blanket
4-28-S	Blast	Blarney
5-28-S	Blister	Blissfully
4-31-S	Blonde	Bloodless
5-31-S	Bloomer	Blotch
4-34-S	Blouse	Bluffer
5-34-S	Blush	Bluster

ROYAL ROUND WATER BOILERS		
Size	High Base	Low Base
4-19-W	Babbling	Bandore
5-19-W	Bachur	Baneful
4-22-W	Bahama	Banjo
5-22-W	Bailiff	Bankside
4-25-W	Balcony	Bargain
5-25-W	Baldness	Batable
4-28 W	Ballad	Beacon
5-28 W	Ballast	Beagle
4-31-W	Ballatry	Beamage
5-31-W	Balmy	Beamless
4-34-W	Baluster	Bertha
5-34-W	Bandana	Beverage

ROYAL SQUARE SECTIONAL BOILERS			
STEAM		WATER	
Size	Code Word	Size	Code Word
S-15-4	Bondage	W-15-4	Bombard
S-15-5	Bonus	W-15-5	Border
S-15-6	Bosom	W-15-6	Botany
S-19-5	Bounce	W-19-5	Brimstone
S-19-6	Bouming	W-19-6	Broach
S-19-7	Boundary	W-19-7	Broaching
S-25-5	Bowider	W-25-5	Brocade
S-25-6	Bracelet	W-25-6	Brogan
S-25-7	Brandy	W-25-7	Broil
S-25-8	Bravado	W-25-8	Brother
S-36-5	Breaker	W-36-5	Browbeat
S-36-6	Breakfast	W-36-6	Brunette
S-36-7	Breast pin	W-36-7	Brutal
S-36-8	Breast plate	W-36-8	Brutalize
S-36-9	Breathe	W-36-9	Brute
S-48-6	Breathing	W-48-6	Bubble
S-48-7	Brevet	W-48-7	Bubbling
S-48-8	Bribery	W-48-8	Buckram
S-48-9	Bridal	W-48-9	Buckskin
S-48-10	Brigadier	W-48-10	Buffoon

KING ROUND BOILERS		
Size	CODE WORD	
	High Base	Low Base
1	Baltoon	Balsam
2	Bamboo	Bandage
2½	Bandit	Banquet
3	Bantam	Barber
3½	Barefoot	Baritone
4	Baron	Baroness
4½	Baronet	Barracks
5	Bashful	Basil
5½	Bassoon	Bastile
6	Bastmado	Bathing
6A	Battalion	Battlement
6½	Bayonet	Beach
6½A	Beaver	Becalm
7	Bedeck	Bedlam
7½	Befall	Befit
8	Beggar	Begwile
8½	Belfry	Belle
9	Benedict	Bengal
9½	Benumb	Bestir
.....	....	....

TELEGRAPH CODE—Continued

NEW KING ROUND WATER BOILERS

Size	Code Word	Size	Code Word	Size	Code Word	Size	Code Word
1	Facia	3½	Fair	5½	Fame	6½A	Fata
1½	Fact	3½B	Fairy	5½B	Fancy	6½A.B	Fawn
2	Fade	4	Fait	6	Farad	7	Faux
2½	Fain	4½	Faith	6A	Farce	7½	Fast
2½B.	Faint	4½B	Fake	6A.B.	Farm	7½B.	Fare
						8	Fang
3	Fall	5	Faker	6½	Faro	8½	Fash

GENERAL

'EAR.....Impossible to obtain Iron in time specified.
'east.....Impossible to make shipment earlier than
'eat.....Pig Iron price now
'ecal.....Radiator prices in U.S. have advanced
'eed.....Boiler prices in U.S. have advanced
'eel.....American Standard Pipe Thread
'eint.....Whiteworth Standard Pipe Thread
'ell.....With Nipples and Half Companion Flangers
'elly.....Can ship in one week
'elt.....Can ship in two weeks
'emur.....Can ship in three weeks
'ence.....Will ship in — weeks
'end.....We can ship at once from stock
'ern.....We can ship at once about
'etid.....We do not understand your telegram
'iat.....Three section boiler
'ichu.....Right hand
'ico.....Left hand
'ield.....Shipment going forward by steamer
'iery.....Draft returned investigate and wire
'ife.....We have made draft for
'ight.....Trace shipment
'ilch.....We have no patterns for
'ile.....We do not manufacture
'ilm.....May we substitute
'inal.....Have you in stock
'inch.....Cannot accept order at prices mentioned
'ind.....Best price at which we can accept order
'ire.....We have not sufficient orders for minimum car-load
'irm.....Can you send us additional orders to make
'ish.....Shall we ship less car-load
'ist.....Prices for immediate acceptance only

TELEGRAPH CODE—Continued

BOILERS—Continued

ROYAL SMOKELESS BOILERS

STEAM		WATER	
Size	Code Word	Size	Code Word
S-249	Cabbage	W-249	Canella
S-250	Cabbin	W-250	Cannabis
S-251	Cactus	W-251	Cannipers
S-338	Caddish	W-238	Canticle
S-339	Cadlock	W-239	Carbine
S-340	Cafenet	W-340	Cardigan
S-341	Caftan	W-341	Cardimina
S-342	Calamar	W-342	Carding
S-343	Calumus	W-343	Carmot
S-344	Calando	W-344	Carnival
S-345	Caicine	W-345	Caromel
S-346	Calcium	W-346	Cartoon
S-347	Calfskin	W-347	Cascade
S-409	Calico	W-409	Casket
S-410	Camajon	W-410	Cassock
S-411	Camaly	W-411	Castle
S-412	Cambist	W-412	Catalan
S-413	Camellia	W-413	Categony
S-414	Cameo	W-414	Cateran
S-550	Camera	W-550	Cavalry
S-551	Camisade	W-551	Cedarn
S-552	Cammock	W-552	Cenatory
S-553	Campaign	W-553	Centrode
S-554	Campus	W-554	Cessant
S-555	Canard	W 555	Chafing
S-556	Candent	W-556	Chagrin
S-557	Candid	W-557	Chalice
S-558	Candock	W-558	Chamade

ROYAL FIRE-BOX BOILERS

STEAM		WATER
Size	Code Word	Code Word
1	Chambray	Cohesion
2	Chanting	Coinage
3	Charmer	Collardo
4	Cherish	Colonge
5	Cherubim	Combine
6	Chinar	Command
7	Ciderage	Condole
8	Cilician	Confide
9	Citadel	Conflict
10	Clarinet	Congener
11	Clarion	Coniger
12	Clement	Conquer
13	Clifton	Contest
14	Clinker	Corindon
15	Clinure	Cornage
16	Cluster	Cornish
17	Coamings	Crafts
18	Codger	Crambo
19	Coffer	Cremona
20	Cognac	Crimson

ROYAL WATER HEATERS

10	Crinkle
12	Crudle
112	Cumber
15	Cuning
115	Curable

LAUNDRY HEATER

1	Curfew

Twin Headers	Calabash
Triple Headers	Caldron
Quadruple Headers	Cadence

TELEGRAPH CODE—Continued

RADIATORS

	Code Word
Imperial, 1 Col. Steam, Plain	Squad
" 1 " Water, "	Squall
" 2 " Steam, "	Squaw
" 2 " Water, "	Squire
" 2 " Steam, Ornamental	Squib
" 2 " Water, "	Squirm
" 3 " Steam, Plain	Squeeze
" 3 " Water, "	Squat
" 3 " Steam, Ornamental	Squatter
" 3 " Water, "	Squadron
" 2 " Steam, Plain Hospital	Squaller
" 2 " Water, " "	Square
" 3 " Steam, " "	Squareness
" 3 " Water, " "	Squash
King, 2 " Steam, Ornamental	Squirrell
" 2 " Water, "	Squander
" 2 " Steam, Plain	Squabber
" 2 " Water, "	Squattish
" 3 " Steam, Ornamental	Stale
" 3 " Water, "	Stable
" 3 " Steam, Plain	Staff
" 3 " Water, "	Stag
" 4 " Steam, Ornamental	Stake
" 4 " Water, "	Stalwart
" 4 " Steam, Plain	Stamp
" 4 " Water, "	Stampede
" 5 " Steam, Window	Staple
" 5 " Water, "	Star
" 9 foot wall, Ornamental	Starch
" 9 " " Plain	Startle
" 7 " " Ornamental	State
" 7 " " Plain	Station
" 6 " " Ornamental	Statue
" 6 " " Plain	Stay
" 5 " " Ornamental	Steadily
" 5 " " Plain	Stiff
Direct—Indirect Bases and Dampers	Stigma
Climax Indirect Steam	Stick
" " Water	Stetson
Wall Radiator Brackets	Steward
Radiator Nipples 1½ in.	Stimulant
" " 2 "	Stimulus

TELEGRAPH CODE—Continued

RADIATOR SECTIONS

	CODE WORD		CODE WORD
2 Sections	Saddle	17 Sections	Sense
3 "	Sailor	18 "	Sentry
4 "	Salad	19 "	Settler
5 "	Salvage	20 "	Shadow
6 "	Sand	21 "	Shellac
7 "	Sapling	22 "	Shot
8 "	Satan	23 "	Slide
9 "	Saunter	24 "	Smoke
10 "	Scandle	25 "	Snob
11 "	Scene	26 "	Snap
12 "	Screw	27 "	Snow
13 "	Scribe	28 "	Solder
14 "	Secret	29 "	Spaniard
15 "	Secure	30 "	Speech
16 "	Seed	.....	.....

Supply Leg Section, 1 Pipe, Steam	Sublime
" " " 2 " "	Submission
" " " Twin Connection, Water	Subscriber
" " " Single " "	Suburban
Blank Leg Section, Steam	Sufferant
" " " Water	Suggestion
Return Leg Section, 1 Pipe, Steam	Sunbeam
" " " 2 " "	Sunburn
" " " Twin Connection, Water	Sundown
" " " Single " "	Sunfish
Centre Leg Section, Steam	Superbus
" " " Water	Supreme
Centre Section, Steam	Surgeon
" " Water	Surrender

RADIATOR BUSHINGS

	CODE WORD		CODE USED
Eccentric	Empress	2 x ½	Enclose
Flush	Empty	2 x ¾	Emerald
1½ x ½	Emulate	2 x 1	Emerge
1½ x ¾	Enamel	2 x 1¼	Eminent
1½ x 1	Encamp	2 x 1½	Empale
1½ x 1¼	Enchant	.....	.....

TELEGRAPH CODE—Continued

TABLE OF DATES

In Telegraphing dates prefix the day of the month, adding "morn" or "aft" which will signify morning or afternoon of the date given, as per example "Dab-mace-aft" will signify "afternoon of January first," etc.

Date	Code Word	Date	Code Word	Month	Code Word
1st	Dab	17th	Ded	January	Mace
2nd	Dam	18th	Deg	February	Mack
3rd	Dan	19th	Deh	March	Madly
4th	Dav	20th	Den	April	Magi
5th	Daf	21st	Deo	May	Mare
6th	Dad	22nd	Dep	June	Maid
7th	Dal	23rd	Deq	July	Mail
8th	Dar	24th	Der	August	Main
9th	Das	25th	Des	September	Make
10th	Dau	26th	Din	October	Man
11th	Daw	27th	Dip	November	Mall
12th	Day	28th	Dis	December	Mark
13th	Daz	29th	Div	.....	.....
14th	Dea	30th	Dit	.....	.....
15th	Deb	31st	Dim	.....	.....
16th	Dec	....	....	.....	.....

Time	Code Word	Time	Code Word
1 Day	Dock	3 Months	Drag
2 Days	Dodge	4 Months	Down
3 Days	Doge	5 Months	Drill
4 Days	Doll	6 Months	Drink
5 Days	Don	Sunday	Dull
6 Days	Dory	Monday	Dope
10 Days	Dose	Tuesday	Dusk
1 Week	Doubt	Wednesday	Dunce
2 Weeks	Draw	Thursday	Duty
3 Weeks	Dray	Friday	Duet
1 Month	Dream	Saturday	Duck
2 Months	Dress	.....	.....

In a day or two.....	Droven
In a few days.....	Drummer
In about a week.....	Downhill
Last of this week or early next.....	Dowel
First of next week.....	Dormant
Not later than.....	Double
Perhaps to-day, at latest, to-morrow.....	Dolphin

TELEGRAPH CODE—Continued

In forming a cipher message the following must be observed.

1. Every Code Word must begin with a capital letter.

2. When a blank space occurs in a sentence of the code, the word to fill in the space must follow the code word; and if more than one blank space occurs the fill-in words must follow in their order after the cipher word.

ORDERS AND SHIPMENTS

Abaft.....Ship immediately.
Abandon.....Ship by express.
Abase.....Ship by express prepaid.
Abash.....Ship by freight.
Abate.....Ship by best route.
Abbe.....Ship by boat.
Abbot.....Ship immediately our order No.....
Abbreviate.....Ship with draft and bill of lading attached.
Abdicant.....Ship in first car to.
Abdomen.....Amended shipping instructions.
Abduce.....Send us bill of lading covering car.
Abuse.....Ship by lake and rail.
Aborn.....Ship to-day sure.
Abeam.....Wire waybill reference and car number our shipment.
Abeaming.....Shipment—not yet received. Trace and advise record.
Abducing.....Shipment—received, part short. Trace shortage and advise.
Akin.....Shipping to-day sure.
Affix.....Shipped to-day.
Affect.....Less car load.
Abcess.....Car load.
Abdom.....Wire if satisfactory.
Abum.....Your order No.——specifies.
Abush.....Your requisition No.——specifies.
Abet.....Enter order as per our inquiry of.
Abhor.....Enter order at your quotation of.
Abide.....Include in car now in preparation.
Abjure.....Ship by same route as our order No.....
Able.....Correction Notices.
Abode.....Will send shipping instructions by mail.
Abominate.....Shipping instructions for order (No. or date) are
Abound.....Ship what you can at once.
Abrupt.....Can't ship as ordered, but could ship to-day.
Abscond.....Do not hold for others but rush quickly.
Absinthe.....Send us small lot unless car going at once.
Absorb.....When can you make shipment.

TELEGRAPH CODE—Continued

ORDERS AND SHIPMENTS—Continued

Abstain.....Can you ship immediately.
Abstract.....When will order (No. or date) be shipped.
Absurd.....When and by what route did you ship our order.
Academic.....Add to our order (No. or date).
Accept.....Duplicate our order (No. or date)
Access.....You may substitute on our order (No. or date).
Accrue.....Omit from our order (No. or date).
Ace.....Hold for instructions order (No. or date).
Ache.....Could ship immediately.
Acid.....Expect to make shipment.
Acme.....Your order (No. or date) was shipped.
Aconite.....If not in stock wire.
Acorn.....Order No.— is ready for shipment. We have no car going for—days. Shall we forward as small lot? If so, wire shipping instructions.
Acrobat.....Order No.—has not yet been shipped.
Acre.....See amended shipping instructions.
Acrimony.....Referring to your amended shipping instructions.
Action.....Can ship complete your No.—immediately except. Shall we make such shipment?
Actuary.....Make proposed shipment order No.—without waiting for——.
Adage.....Wire at once routing our material covered by
Adament.....When will you ship car containing our order?
Adapt.....See our correction notice.
Add.....Referring to your correction notice.
Addict.....Your order (No. or date) does not specify.
Addle.....Change our order (No. or date) to read
Address.....Referring to your order (No. or date).
Adduce.....Referring to our order (No. or date).
Adhere.....Do not find any order from you (No. or date).

QUOTATIONS AND CORRESPONDENCE

Adhesive.....At what price and how soon can you furnish.
Adieu.....Quote best price on.
Adjacent.....In market for.
Adjoin.....Quote best price on——square feet of standard (38-inch) height of Radiators.
Adjust.....Wire reply quickly.
Admire.....Will wire you to-morrow morning.
Admit.....Have written.
Almond.....Must have information immediately.

TELEGRAPH CODE—Continued

QUOTATIONS AND CORRESPONDENCE—Continued

Along.....Answer by first mail.
Alter.....See our letter of—giving full particulars.
Alto.....Have received no reply from you to our letter.
Alumina.....Referring to your telegram of.
Amateur.....Referring to your letter of
Amaze.....Have received no reply to our telegram of
Amber.....Referring to our letter of
Ambition.....Referring to telephone conversation of to-day.
Ambush.....Do not understand meaning of
Ample.....Inclosure mentioned in your letter of—not received. Mail same at once.
Amuse.....We quote you for immediate acceptance
Anchor.....Wire carload freight rate on
Ancient.....Answering your wire of date the carload rate per cwt. and minimum weight on
Annex.....Change my route to read as follows
Annul.....Will be here until
Antic.....Will be in

FINANCIAL

Adopt.....Ship nothing more until account reduced
Adore.....Investigate credit of
Adulation.....Have investigated credit and think people safe
Advance.....Reference furnished not satisfactory
Advent.....Holding order for better credit reference
Advert.....Cannot ship until you collect present account
Advertise.....Have you received settlement from
Advice.....How much does—owe us on unpaid notes?
Advocate.....—Has promised settlement on—
Aeronaut.....Collect to-day or file lien, advising us fully by mail
Affair.....We cannot wait on—any longer unless you can collect on or before——place with attorney
Affection.....Instruct attorney to file suit in matter of—
Again.....We cannot collect account of—owing to
Agree.....We are offered—in settlement of account of——shall we accept it??
Aim.....Think it advisable to accept amount offered in settlement?
Alibi.....Account note settlement—account
Air.....Shall we accept renewal on—note due—
Aisle.....May we extend additional credit—dollars to (—)

TELEGRAPH CODE—Continued

FINANCIAL—Continued

Alarm.....Do you recommend accepting notes in settlement—account?
Alive.....Accept settlement one-half note and one-half cash—account
Alcove.....Do not accept notes—account. Must have cash settlement in full

TRANSPORTATION LINES
RAILROADS

CANADIAN LINES

Rammer.....Canadian Northern Ontario Rly.
Range.....Canadian Northern Quebec Rly.
Rake.....Canadian Pacific Rly.
Rajah.....Grand Trunk Rly.
Robin.....Intercolonial Rly.
Rodent.....Michigan Central Rly.
Romance.....Niagara St. Catharines & Toronto Rly.
Rosebud.....Pere Marquette Rly.
Restful.....Soo Line.
Remnant.....Temiskaming & Northern Ontario Rly.
Resident.....Toronto, Hamilton & Buffalo Rly.
Rajole.....Grand Trunk Pacific Rly.
Robust.....Halifax & Southwestern Rly.
Ranker.....Dominion Atlantic Rly.
Relent.....Reid Newfoundland Rly.
Reformer.....Dominion Transportation Co.

AMERICAN LINES

Rawhide.....Chicago, Milwaukee & St. Paul Rly.
Rebater.....Great Northern Rly.
Redcoat.....North Western Rly.

NAVIGATION LINES

Redwing.....Canada Steamship Lines.
Refresher.....Northern Navigation Co.
Rejoinder.....Richelieu & Ontario Navigation Co.

EXPRESS COMPANIES

Relation.....Canadian
Reluctant.....Dominion
Ringman.....All Rail
Roguish.....All Water
Rustic.....Lake and Rail
Relearn.....Canadian Northern

TELEGRAPH CODE—Continued

NUMBERS

No.	Code Word	No.	Code Word	No.	Code Word	No.	Code Word
0	Abh	18	Cos	46	Fea	74	Kil
00	Abs	19	Clo	47	Fip	75	Kim
01	Aca	20	Dra	48	Fon	76	Kip
02	Ack	21	Dre	49	Fom	77	Kit
03	Acm	22	Dru	50	Gar	78	Kio
04	Ada	23	Drn	51	Gan	79	Kna
05	Adm	24	Dro	52	Gen	80	Lab
06	Adv	25	Drs	53	Geo	81	Lan
07	Age	26	Due	54	Gio	82	Lac
08	Agr	27	Dus	55	Gle	83	Lad
09	Aga	28	Dyn	56	Gos	84	Lup
1	Bic	29	Dyo	57	Gra	85	Lus
2	Bin	30	Ecc	58	Gre	86	Luc
3	Bar	31	Edi	59	Gro	87	Lim
4	Bat	32	Ele	60	Haf	88	Lew
5	Bea	33	Elo	61	Hag	89	Lax
6	Bel	34	Elu	62	Han	90	Net
7	Ben	35	Ema	63	Ham	91	Nem
8	Bes	36	Emb	64	Hap	92	Nig
9	Bom	37	Emd	65	Har	93	Non
10	Car	38	Emy	66	Haw	94	Nov
11	Cap	39	Emo	67	Hat	95	Nom
12	Cas	40	Fin	68	Hos	96	Nei
13	Cen	41	Fio	69	Hun	97	Neo
14	Ces	42	Fle	70	Kab	98	New
15	Cha	43	Flu	71	Kar	99	Nie
16	Chi	44	Fos	72	Kan		
17	Cho	45	Fra	73	Kam		

TO MAKE UP A CODE WORD ABOVE 99

EXAMPLE:—

525	..	5—Bea	25—Drs	..	"Beadrs"
1879	..	18—Cis	79—Kna	..	"Ciskna"
10741	..	1—Bic	07—Age	41—Fio	..	"Bicagefio"
100624	..	10—Car	06—Adv	24—Dro	..	"Car dvdro"

INDEX

BOILER SECTION

ROUGHING-IN SECTION
BOILERS

REPAIR SECTION
BOILERS

RADIATOR SECTION

INDEX—Continued

ROUGHING-IN SECTION
RADIATORS

RADIATOR REPAIRS

VALVES, FITTINGS, ETC.

INDEX—Continued

VALVES, FITTINGS, ETC.

USEFUL ENGINEERING DATA, ETC.

BRIGDENS LIMITED
TORONTO CANADA